DEPARTMENT OF THE ARMY TECHNICAL MANUAL

DEPARTMENT OF THE AIR FORCE TECHNICAL ORDER

TM 11-5820-202-20

TO 31R2-2GRC26-154

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RADIO SETS AN/GRC-26A AN/GRC-26B AN/GRC-26C

ORGANIZATIONAL MAINTENANCE

SECOND ECHELON

DEPARTMENTS OF THE ARMY AND THE AIR FORCE

DECEMBER 1958

WARNING

Be careful when working on the 115-volt ac line connections. Serious injury or death may result from contact with these terminals.

DON'T TAKE CHANCES
AN EXTREMELY DANGEROUS VOLTAGE (2,500 VOLTS) EXISTS IN RADIO TRANSMITTER BC-610-(*)

When the transmitter is operating, keep away from all antenna connections and Antenna Tuning Unit BC-939-B. Extremely high current radio-frequency energy exists at those points.

Do not add gasoline to the vehicle fuel tank or the fuel tank of the power unit while transmitting. Radio-frequency voltage on the chassis of the vehicle may cause a spark resulting in an explosion. Turn off the radio transmitter and the power unit and *keep them off* until refueling is finished. To prevent explosions caused by static electricity, *always* ground the fuel container to the fuel tank before pouring gasoline from container to tank. *Do not smoke* during refueling operations.

TECHNICAL MANUAL
No. 11-5820-202-20
TECHNICAL ORDER
No. 31R2-2GRC26-154

DEPARTMENTS OF THE ARMY
AND THE AIR FORCE
WASHINGTON 25, D.C., *24 December 1958*

RADIO SETS AN/GRC-26A, AN/GRC-26B, AND AN/GRC-26C

ORGANIZATIONAL MAINTENANCE

SECOND ECHELON

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***This manual supersedes so much of TM 11-264A, 6 January 1953, C 1, 19 May 1954; C 2, 27 September 1954; C 3, 27 October 1955; C 4, 1 March 1956; C 5, 26 April 1956; and C 6, 29 May 1958, as to organizational maintenance of the equipment.**

CHAPTER 1

MAINTENANCE INSTRUCTIONS

Section I. GENERAL

1. Scope

a. This manual covers second echelon maintenance of Radio Sets AN/GRC–26A, –26B, and –26C. The operating instructions for these equipments are contained in TM 11–5820–202–10.

b. Second Echelon maintenance for Radio Set AN/GRC–26(*) consists of the following:

(1) Replacement of defective fuses (TM 11–5820–202–10).
(2) Visual inspection (par. 6).
(3) Preventive maintenance (par. 4).
(4) Lubrication (par. 5).
(5) Troubleshooting (par. 7).
(6) Replacement of defective tubes (par. 8).
(7) Replacement of relay (par. 11), lenses, lamps, cords, connector adapters, mast plate (TM 11–5820–202–10), and the air heater.
(8) Voltage and resistance measurements (pars. 9 and 10).

c. **Forward comments concerning this manual to the Commanding Officer, United States Army Signal Publications Agency, Fort Monmouth, N.J.**

Note. For applicable forms and records, see paragraph 2, TM 11–5820–202–10.

2. Internal Differences in Models

Radio Sets AN/GRC–26A, –26B, and –26C are similar in purpose, general operation, and equipments except for some teletypewriter equipments, cabinet assemblies, and modifications to improve operational features. Refer to the Differences in Models paragraph in TM 11–5820–202–10 for information on differences. For differences in models of individual components of Radio Set AN/GRC–26(*), refer to their respective technical manuals (TM 11–5820–202–10).

3. Tools, Materials, and Test Equipment

The tools, materials, and test equipment required for organizational maintenance are listed below:

a. Tools.
(1) Tool Equipment TE–41.
(2) Tool Equipment TE–50B.
(3) Test Prod Assembly (Federal stock No. 6625–510–1841) (fig. 1).

b. Materials.
(1) Cleaning Compound (Federal stock No. 7930–395–9542).
(2) Lint-free bleached cheesecloth.
(3) Three-ounce can of lubricating oil.
(4) Lubricating oil, internal combustion engine (OE–10).
(5) Lubricating oil, general purpose, preservative (PL special).
(6) Sandpaper, flint No. 000.

c. Test Equipment.
(1) Multimeter AN/URM–105, or equal.
(2) Electron Tube Test Set TV–7/U, or equal (TM 11–5083).
(3) Tube Socket Adapter Kit MX–1258/U.

4. Preventive Maintenance

a. DA Form 11–238 (figs. 2 and 3) is a preventive maintenance checklist to be used by organizational maintenance personnel. References in the ITEM block in the figures are to paragraphs which contain additional information pertinent to the particular item. Instructions for the use of the form appear on the form.

***Warning:* Disconnect all power before performing the following operations. When power to the equipment is disconnected, some capacitors still may retain dangerous voltages. Short circuit the capacitor. When maintenance is completed, replace the equipment in its case, reconnect the power, and check for satisfactory operation.**

b. Records of the maintenance and inspection of the major components which make up Radio Set AN/GRC–26(*) are maintained on separate DA Forms 11–238, 11–240, 11–252, and 11–267 for the major component. Specific instructions for the preventive maintenance of each component are

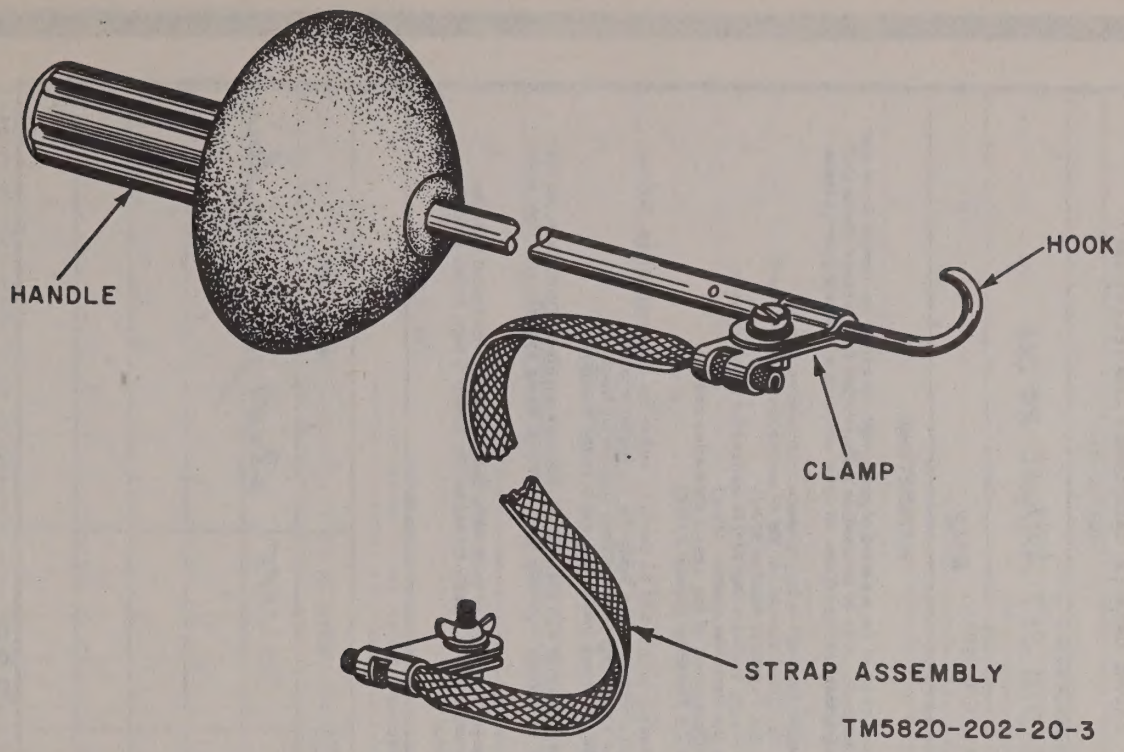

Figure 1. Test prod assembly.

contained in its respective manual TM 11-5820-202-10. Figures 2 and 3 are applicable to the remaining equipments of the radio set. These include the shelter, the various antennas, antenna accessories and lead-ins, Radio Set Control Group AN/GRC-14, blower assembly, Radio Teletypewriter Control C-808/GRC-26A, and Transmitter-Teletypewriter Control C-808A/GRC-26A. Items not applicable to these equipments are lined out in the figure.

Item	Maintenance procedure
5	Inspect doublet antenna for dirty or loose jumper between sections.
6	Use fine sandpaper to remove rust or corrosion.
15	Inspect the tightness of tube clamps in the mark power supply of the teletypewriter control unit.

5. Lubrication

a. General.

(1) The type of lubricant to be used, the interval, and the specific instructions for each component of Radio Set AN/GRC-26(*) are given in the respective technical manuals.

(2) Before applying lubricant, be sure parts are thoroughly clean and free from dust and dirt. Lubricate sparingly. Wipe off excess lubricant.

(3) Apply oil (PL special) sparingly to springs and loops of all helical springs, to prevent wear and rust.

b. Shelter Ventilating Blower and Blower Motor. Weekly, fill oilcups at each end of motor with OE-10 oil. The blower and blower motor (TM 11-5820-202-10, fig. 3) are located near the ceiling of the shelter above the transmitter.

c. Mechanical Devices of Shelter. The movable parts of the shelter should be covered weekly with a thin film of oil (OE-10). Following is a list of the parts to be lubricated:

(1) Hinges of the ventilator hatch covers.

(2) Latches of the ventilator hatch covers (TM 11-5820-202-10, fig. 4).

(3) Runway of the sliding storage cabinet doors.

(4) Hinges of the entrance door (TM 11-5820-202-10, figs. 3 and 5).

d. Raceways of Cabinets. The raceways of cabinets (fig. 4) should be lubricated with oil (PL special) to assure easy removal of chassis for repairs.

e. Component Hinged Doors. Each week, place a few drops of oil on the hinges of the following components:

ADDITIONAL ITEMS FOR 2D AND 3D ECHELON INSPECTIONS	CONDITION
26. INSPECT ANTENNA FOR ~~BROKEN INSULATORS~~, CORROSION, LOOSE FIT, DAMAGED INSULATORS, ~~AND REFLECTORS.~~	✓
27. CHECK FOR NORMAL OPERATION. (PAR. 7)	X
28. ~~BEFORE SHIPPING OR STORING, REMOVE BATTERIES~~	

IF DEFICIENCIES NOTED ARE NOT CORRECTED DURING THE INSPECTION, INDICATE ACTION TAKEN FOR CORRECTION.

ITEM 27. TEST KEY ON FREQUENCY-SHIFT EXCITER NEEDS REPLACEMENT REPORTED TO 3RD ECHELON MAINTENANCE FOR REPAIR.

FOLD

MAINTENANCE CHECK LIST FOR SIGNAL EQUIPMENT
SOUND EQUIPMENT, RADIO, DIRECTION FINDING
RADAR, CARRIER, RADIOSONDE AND TELEVISION
(AR 750-625)

EQUIPMENT NOMENCLATURE: RADIO SET AN/GRC-26 (*)

EQUIPMENT SERIAL NUMBER: 242

INSTRUCTIONS

This form may be used for a period of one month by using the correct dates and weeks of the month. It is to be used as a Preventive Maintenance check list for Signal equipment in actual use, or for a check on equipment prior to issue.

1. For detailed Preventive Maintenance instructions see:
   a. The Technical Manual *(in TM 11 series)* for the equipment. *(See DA Pamphlet Number 310-4)*
   b. The Supply Bulletin *(SB 11-100 series)* for the equipment. *(See DA Pamphlet Number 310-4)*
   c. The Department of the Army Lubrication Order. *(See DA Pamphlet Number 310-4)*

2. The following action will be taken by either the Communications Officer/Chief for 1st echelon, or the Inspector for higher echelon:
   a. Enter Equipment Nomenclature and Serial Number.
   b. Strike out items that do not apply to the equipment.

3. Operator/Inspector will enter in the columns entitled CONDITION, on the proper line, a notation regarding the condition, using symbols specified under LEGEND.

4. After operator completes each daily inspection he will initial over the appropriate dates under "Daily Condition for Month", then return form to his supervisor.

TYPE OF INSPECTION

OPERATOR	2/3 ECHELON	DATE	SIGNATURE
	✓	30 SEPT.	Arleigh J. Breglear.

DA FORM 1 MAY 57 11-238

REPLACES DA FORMS 11-238, 1 NOV 55; 11-239, 11-244, 11-245, 11-248, 11-249, 11-250, AND 11-251; WHICH ARE OBSOLETE.

TM5820-202-20-1

Figure 2. DA Form 11-238, pages 1 and 4.

LEGEND for marking conditions:
Satisfactory, ✓.
Adjustment, Repair or Replacement required, X.
Defect corrected, (X).

DAILY CONDITION FOR MONTH OF SEPTEMBER, 1958

NO.	DAILY ITEM	1/17	2/18	3/19	4/20	5/21	6/22	7/23	8/24	9/25	10/26	11/27	12/28	13/29	14/30	15/31	16	2D 3D ECH-ELON
1.	COMPLETENESS AND GENERAL CONDITION OF EQUIPMENT. ~~(Transmitter, receiver, carrying cases, wire, cables, microphones, tubes, spare parts, technical manuals).~~																	✓
2.	CLEAN DIRT AND MOISTURE FROM ANTENNA, MICROPHONES, HEADSETS, KEYS, JACKS, PLUGS, COMPONENT PANELS.																	✓
3.	INSPECT CONTROLS FOR NORMAL OPERATION. TAP CONTROLS LIGHTLY FOR EVIDENCE OF CUT-OUT FROM LOOSE CONTACTS.																	✓
4.	CHECK FOR NORMAL OPERATION OF EQUIPMENT. BE ALERT FOR UNUSUAL OPERATION OR CONDITION.																	✓

WEEKLY	CONDITION EACH WEEK 1ST	2D	3D	4TH	5TH	2D 3D ECH
5. CLEAN AND TIGHTEN EXTERIORS OF CASES, RACKS, MOUNTS, TRANSMISSION LINES. PAR. 4b						✓
6. INSPECT CASES, MOUNTS, ~~ANTENNA~~ TOWERS AND EXPOSED METAL SURFACES FOR RUST, CORROSION. PAR. 4b						✓
7. INSPECT CORDS, CABLE, WIRE, SHOCK MOUNTS FOR CUTS, KINKS, BREAKS, FRAYING, UNDUE STRAIN.						✓
8. CHECK ANTENNA GUY WIRES FOR PROPER TENSION OR DAMAGE.						✓
9. INSPECT CANVAS ~~AND LEATHER~~ ITEMS FOR MILDEW, TEARS, FRAYING.						✓
10. INSPECT ACCESSIBLE ITEMS FOR LOOSENESS: SWITCHES, KNOBS, JACKS, CONNECTORS, RELAYS, TRANSFORMERS, MOTORS, PILOT LIGHTS, BLOWERS, ETC.						⊗
11. CLEAN AND/OR INSPECT AIR FILTERS, BRASS NAME PLATES, DIAL AND METER WINDOWS. PAR. 5f						✓
12. ~~INSPECT STORAGE BATTERIES FOR DIRT, LOOSE TERMINALS, SPECIFIC GRAVITY, DAMAGED CASES. INSPECT DRY BATTERIES FOR LEAKAGE.~~						

ADDITIONAL ITEMS FOR 2D AND 3D ECHELON INSPECTIONS	CONDITION
13. INSPECT SHELTERS AND COVERS FOR ADEQUACY OF WEATHER-PROOFING, TEARS, FRAYING.	✓
14. CHECK TERMINAL BOX COVERS FOR CRACKS, DIRT, LEAKS, DAMAGED GASKETS, GREASE.	✓

ADDITIONAL ITEMS FOR 2D AND 3D ECHELON INSPECTIONS	CONDITION
15. INSPECT SEATING OF READILY ACCESSIBLE PLUCK-OUT ITEMS: TUBES, LAMPS, FUSES, ~~CRYSTALS~~, CONNECTORS, ~~VIBRATORS, PLUG-IN COILS~~. PAR. 4b	✓
16. INSPECT RELAYS AND CIRCUIT BREAKERS FOR LOOSE MOUNTINGS, BAD CONTACTS. ~~MIS-ALINEMENT OF CONTACTS AND SPRINGS, PROPER SPRING TENSION~~.	✓
17. ~~INSPECT VARIABLE CAPACITORS FOR DIRT, MIS-ALINEMENT OF PLATES, LOOSE MOUNTINGS, MOISTURE.~~	✓
18. INSPECT RESISTORS, BUSHINGS AND INSULATORS FOR CRACKS, CHIPPING, BLISTERING, MOISTURE, DISCOLORATION.	✓
19. CLEAN AND TIGHTEN SWITCHES, TERMINAL BLOCKS, BLOWERS, RELAY CASES AND INTERIORS OF CHASSIS AND CABINETS NOT READILY ACCESSIBLE.	✓
20. INSPECT TERMINAL BLOCKS FOR LOOSE CONNECTIONS, CRACKS AND BREAKS.	✓
21. INSPECT TERMINALS OF LARGE ~~FIXED CAPACITORS AND~~ RESISTORS FOR DIRT, CORROSION, LOOSE CONTACTS.	✓
22. INSPECT TRANSFORMERS, CHOKES, POTENTIOMETERS AND RHEOSTATS FOR OVERHEATING AND OIL LEAKAGE.	✓
23. ~~INSPECT GENERATORS, AMPLIDYNES, DYNAMOTORS FOR BRUSH WEAR, SPRING TENSION, ARCING AND FITTING OF COMMUTATOR.~~	
24. ~~INSPECT CATHODE RAY TUBES FOR BURNT SCREEN SPOTS.~~	
25. INSPECT WATERPROOF GASKETS FOR LEAKS, WORN OR LOOSE PARTS.	✓

CONTINUED ON PAGE 4

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Figure 3. DA Form 11–238, pages 2 and 3.

(1) Two doors on the top of the transmitter (TM 11–5820–202–10, fig. 3).

(2) Door in the front panel of the converter unit (TM 11–5820–202–10, fig. 9 or 10).

(3) Door in the front panel of the power supply unit (TM 11–5820–202–10, fig. 9 or 10).

Note. Intervals given are maximums for normal 8-hour-day operations. For abnormal conditions or activities, intervals should be shortened accordingly.

f. Electrical Equipment Cabinet CY–1216/U, Blower Assembly.

(1) The blower motor requires lubrication with oil (OE–10) every 6 months. This is accomplished by filling the two oilholes (fig. 5) on the motor housing with a few drops of lubricant. Wipe off any excess oil.

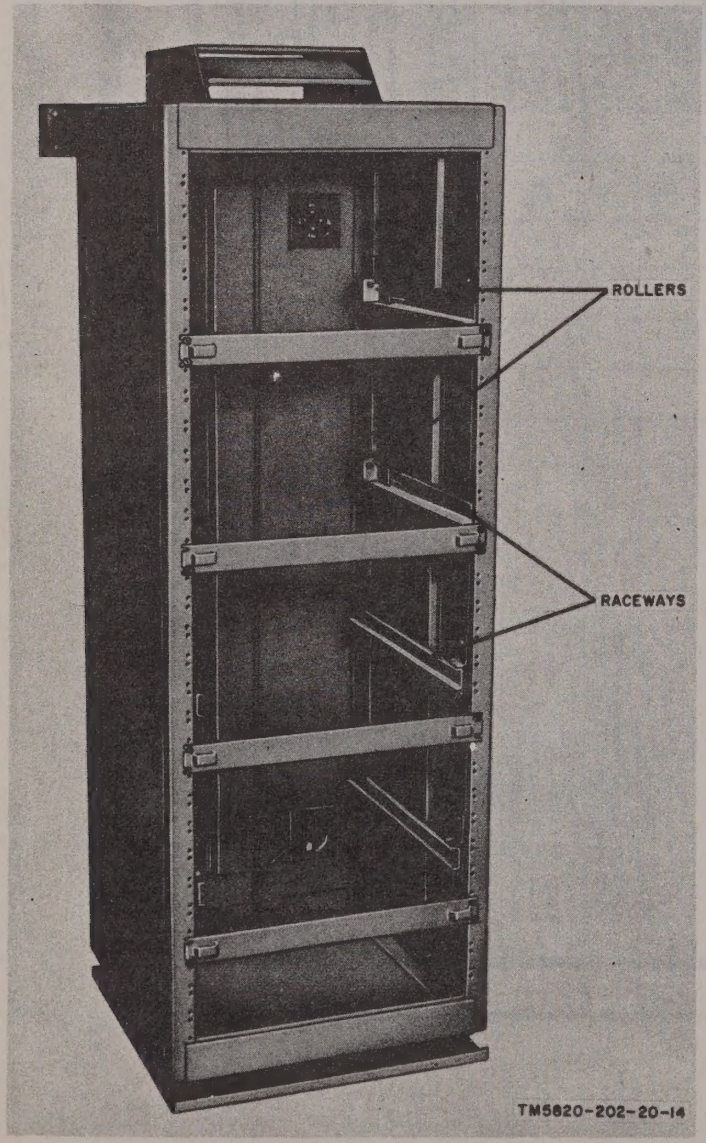


Figure 4. Electrical Equipment Cabinet CY–1216/U, front view.

(2) The two air filters in this assembly should be removed, cleaned, and oiled at 3-month intervals. Shorter intervals may be required if excessive dirt or dust is present.

(3) The grill of the blower assembly may be removed by removing two small screws on the side of the ON-OFF switch and four larger screws which fasten the cabinet frame. Do not remove the screws that fasten the blower assembly to the cabinet frame

(4) Remove the filters and wash them in Cleaning Compound if it is available. Ordinary soap and water will suffice if Cleaning Compound is not available. Dry the filter with compressed air at low pressure.

***Warning:* Cleaning Compound is flammable and its fumes are toxic. Do not use near a flame and provide adequate ventilation.**

(5) Oil the filters by dripping or spraying them with oil (OE–30). Remove any excess oil so that the blower assembly and the cabinet do not become soiled. Replace the filters and the grill.

g. Parts Lubricated. The parts of the equipment which are to be lubricated are listed in the chart below:

Part	Military lubricant	Commercial lubricant	Lubrication period
Roller bearings in all wall cabinets.	Oil (PL special)	----------	Weekly.
Hinges for door, windows, cabinets, locking devices, and snap fasteners.	Oil (PL special)	----------	Weekly.
Blower and blower motor.	Oil (OE–10)	SAE 10	Semiannually.

h. Lubrication Under Unusual Conditions.

(1) *Arctic regions.* Lubricants which are satisfactory at moderate temperatures stiffen and solidify at subzero temperatures; as a result, moving parts bind or become inoperative. Use the grade of lubricant recommended for the equipment in arctic regions. Refer to TM 11–904 for lubricating information on

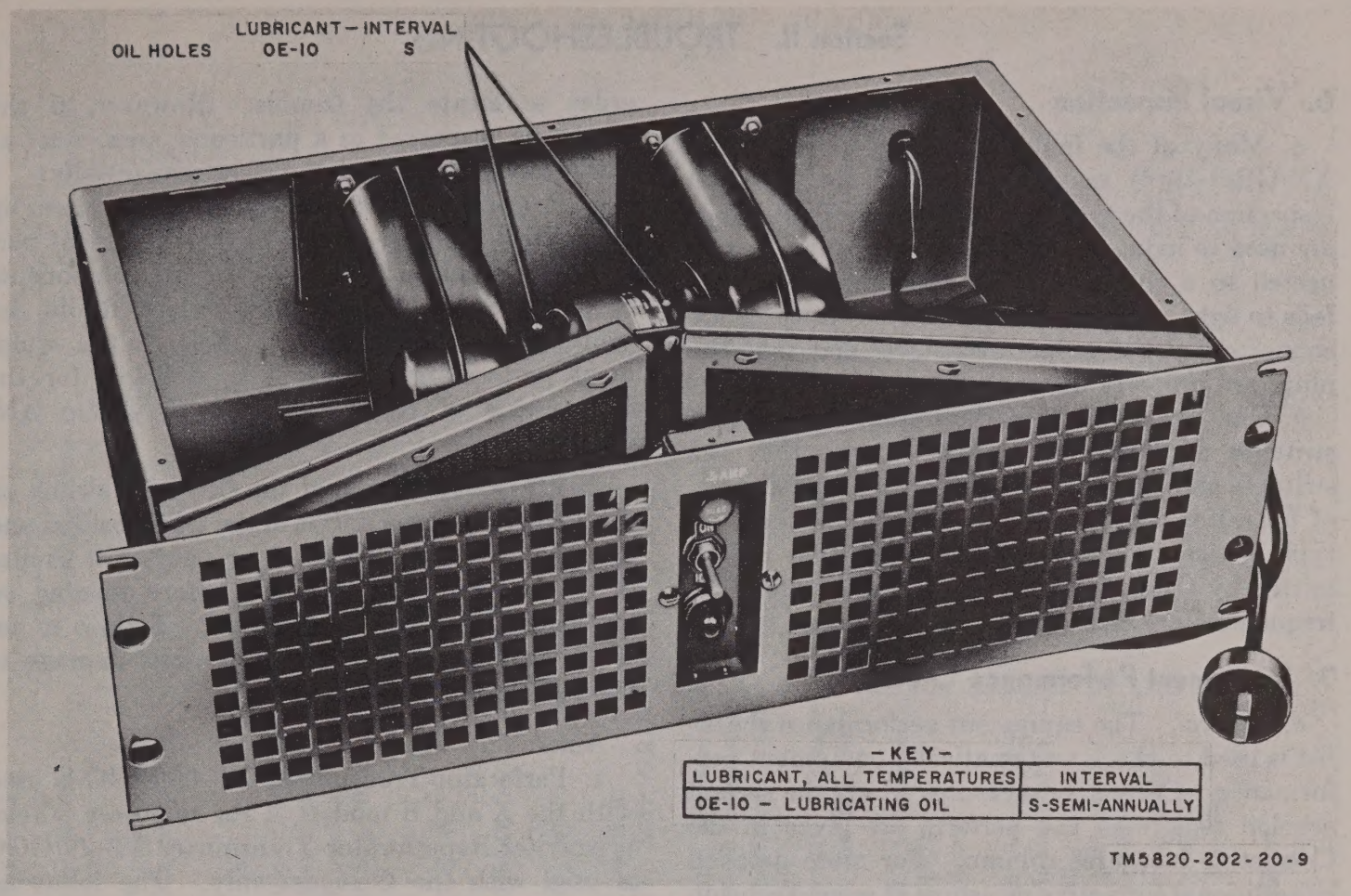


Figure 5. Electrical Equipment Cabinet CY–1216/U, blower assembly.

Power Unit PE–95–G. When preparing the equipment for low-temperature operation, see that the lubricants used for moderate temperatures are thoroughly removed. Even small amounts of such lubricants, if allowed to remain, may impair the operation of moving parts. *Be sure to use the lubricant specified for low-temperature operation.*

(2) *Tropical regions.* High temperatures and moisture due to rain, condensation, etc. may cause lubricants which are normally satisfactory to flow from moving parts and other surfaces. These bearing surfaces will wear excessively, and hinges, fastenings, and other parts will become damaged or destroyed by rust and corrosion. Inspect the equipment daily and lubricate it as required to insure efficient operation. Use lubricants suitable for high temperatures.

(3) *Desert regions.* Dust and sand infiltration into the equipment causes grit in the lubricants and will seriously impair and damage the moving parts of the set. Hot, dry temperatures cause the lubricants to flow from the moving parts, and conditions similar to those described in (2) above will result. Use lubricants suitable for high temperatures. Inspect and clean the equipment daily.

(4) *Lubricants.* For operation under climatic conditions in which extreme temperatures are encountered, the lubricants listed below should be used in place of those specified in *a* through *g* above.

Lubricant specified	For temperature		
	Above 32° F.	32° F. to 0° F.	Below 0° F.
OE–10	OE–10	PL special	PL special.
PL special.			
GL[a]	GL	GL	PL special.
WB[b]	WB	GL	GL.

[a] Grease, aircraft and instrument (GL).
[b] Grease, automotive No. 2 (WB).

Section II. TROUBLESHOOTING

6. Visual Inspection

a. Many of the faults appearing in Radio Set AN/GRC–26(*) may be detected by a visual inspection of the system components. Pilot lamps are used to indicate when the power source is connected to a component. If the indicating lamp fails to light, check to see that the power cords are connected to the proper receptacle and that the plugs are properly inserted.

b. One type of fault is the improper setting of switches and controls. Check to see that the switches and controls are set properly for the mode of operation being used. Check to see that the type of operation and service is one that is permitted by the tactical situation; check to see that frequencies are chosen properly.

7. Equipment Performance Checklist

a. General. The equipment performance checklist is used to check systematically equipment performance. Corrective measures which the second echelon repairman can perform are given in the Corrective measures column. For more detailed or additional corrective measures at second echelon refer to the organizational maintenance procedures in the appropriate technical manual. If the action taken by the repairman does not correct the fault, additional maintenance must be performed by by maintenance personnel having adequate tools, test equipment, and authority. This maintenance is covered in the appropriate technical manual for that particular maintenance man. The repairman should note on the repair tag how the equipment performed and what corrective measures were taken. In using the checklist, start at the beginning and follow each step in order to locate the trouble. However, if the trouble is suspected in a particular area, start at that point and continue the steps sequentially.

b. Procedure. Allow the equipment to warm up for at least 2 hours. Refer to the equipment performance checklist in *c* below for all components of Radio Set AN/GRC–26(*) except Radio Set Control Group AN/GRA–14. Refer to the equipment performance checklist in *d* below for the components of Radio Set Control Group AN/GRA–14.

Caution: **Be sure that the ON-OFF switch on the radio set control unit is in the OFF position and that the TEST key on the frequency-shift exciter is in the NORMAL position before turning on any components of the radio set. Failure to set these switches may result in serious damage to the radio transmitter.**

Notes:

1. Perforator-Transmitter TT–56/MGC is used with the A and B models of the radio set. Teletypewriter Reperforator-Transmitter TT–76/GGC is used with the C model only. The following checklist covers these units separately and successively.

2. Teletypewriter TT–55/MGC was supplied as a standard item in some AN/GRC–26A equipments. In other AN/GRC–26A equipments, and all B and C models, Teletypewriter TT–4A/TG is used.

3. The procedures given in the checklist are for operation on a full-duplex basis. To observe all normal indications listed, the repairman must operate the AN/GRC–26* into a similar radio set.

c. Radio Set AN/GRC–26(*) (excluding Radio Set Control Group AN/GRA–14).

	Step	Unit	Item	Action or condition	Normal indication	Corrective measures
PREPARATORY	1	Shelter	Circuit breakers	Set to OFF position.		
	2	Electrical Equipment Cabinet CY–1216/U blower assembly.	Blower ON-OFF switch	Set to OFF position.		
	3	Frequency-shift exciter	AC SUPPLY switch	Set to off (down) position.		
			OVEN switch	Set to off (down) position.		
			TEST OSC switch	Set to OFF position.		
			TEST key	Set to NORM position.		
	4	Radio Transmitter BC–610–(*).	FILAMENT POWER switch.			
			FILAMENT VOLTAGE control.	Set fully C. C. W.		
			HIGH VOLTAGE PROTECT switch.	Set to NORMAL (off).		
			EXCITER PLATE POWER switch.	Set to off (down).		
			PHONE-CW switch	Set to CW position.		
			EXCITATION METER SWITCH.	Set to INT. AMP GRID X 1.		
			BAND SWITCH	Set to channel corresponding to desired tuning unit.		
			Tuning unit	Check selection of proper tuning unit.		
			Coil unit	Check selection of proper coil unit for frequency desired.		
	5	Frequency-shift converter	OUTPUT switch	Set to NORMAL position		
			METER B switch	Turn to INPUT.		
			DRIFT COMPENSATOR switch.	Set to out (down).		
	6	Power supply	AC SUPPLY switch	Set to off (down) position.		
			PLATE power switch	Set to off (down) position.		
	7	Radio Receiver	OFF-STAND BY-ON	Turn to OFF.		
			AVC-OFF-ON switch	Set to OFF position.		
			BAND CHANGE switch	Set to band desired.		
			Tuning control	Set to frequency desired.		
			CALIBRATE	Set to OFF position.		
			LIMITER	Set to OFF position.		
			CRYSTAL FILTER:			
			SELECTIVITY	Set to 0 position.		
			PHASING	Set to white line.		

c. *Radio Set AN/GRC–26(*) (excluding Radio Set Control Group AN/GRA–14)*—Continued.

	Step	Unit	Item	Action or condition	Normal indication	Corrective measures
PREPARATORY	8	Rectifier RA–87–(*)	ON-OFF switch	Set to OFF position.		
	9	Radio Teletypewriter Control C–808/GRC–26A	TT TRANSPOSE switch	Set to RIGHT REC-LEFT SEND.		
			PERFORATOR OPERATION.	Set to PUNCH TAPE.		
			XMTR ON-XMTR OFF	Set to XMTR OFF position.		
			ON-OFF power switch	Set to OFF position.		
	10	Teletypewriter TT–55/MGC	ON-OFF switch	Set to OFF.		
	11	Teletypewriter TT–4A/TG	MOTOR switch	Set to OFF.		
	12	Typing reperforator (part of Reperforator - Transmitter TT–56/ or MGC)	MOTOR switch	Set to MOTOR OFF position.		
	13	Teletypewriter Reperforator-Transmitter TT–76/GGC.	POWER switch	Set to OFF position.		
	14	Transmitter-distributor (part of Perforator - Transmitter TT–56/M or GC).	MOTOR ON-MOTOR OFF switch.	Set to MOTOR OFF position.		
			STOP-SEND switch.	Set to SEND.		
	15	Tape transmitter (part of Reperforator - Transmitter TT–76/GGC).	START - STOP - FEED RETRACT switch.	Set to STOP position.		
START	16	Power Unit PE–95–G	START button	Press and hold in	Power unit starts	Check for discharged battery. Add fuel. Refer to troubleshooting chart in TM 11–904.
			CIRCUIT BREAKER switch.	Set to ON	Normal line voltage (117 volts indicated on AC VOLT meter on power unit panel).	Reset circuit breaker. Refer to troubleshooting chart in TM 11–904.
	17	Shelter S–69/GRC	Circuit breakers	Set to ON	Shelter lamps go on	Check circuit breaker. Check Power Cable Assemblies CX–1165/U, CX–1166/U from Power Unit PE–95–G or commercial source if used.
	18	Electrical Equipment Cabinet CY–1716/U, blower assembly.	BLOWER switch	Set to ON	Pilot lamp and blower energize.	Check fuse connections and switch in blower assembly.
	19	Frequency Shift Exciter 0–39 (*)/TRA–7.	AC SUPPLY and OVEN switches.	Set to ON position at least 2 hours before initial adjustment.	AC SUPPLY and OVEN indicator lamps light.	Check Cord CX–962/TRA–7, fuses, and lamps.

		OSCILLATOR RANGE switch.	Set in accordance with calibration chart.		
20	Radio Transmitter BC–610–(*).	FILAMENT POWER switch.	Set switch to on (up). Wait 1 minute for filaments to reach operating temperature.	Green pilot lamp and transmitter tuning unit (inside transmitter) light.	If both lamps are out, check fuses FS1, FS2, and FS4 and Cord CD–763.
					Replace lamp, check Cord CD–764.
				Red pilot lamp on Speech Amplifier BC–614–(*) lights.	
		FILAMENT VOLTAGE control.	Turn partially clockwise	FILAMENT VOLTAGE meter reads 5 volts.	Adjust FILAMENT VOLTAGE control.
21	Power Supply PP–712(*)/GRC–26A.	AC SUPPLY switch	Set to ON position	White-capped pilot lamp should light.	Check Cord CX–954/TRA–7, fuses, and lamp.
		PLATE power switch	Set to ON position	Red-capped pilot lamp should light.	Check Cord CX–954/TRA–7, fuses, and lamp.
22	Radio Receivers R–388/URR	OFF-STANDBY-ON switch.	Turn to ON position	Dial lamps light	Check fuse at rear of chassis.
					Check power cord and plugs.
		RF GAIN and AUDIO GAIN controls.	Turn clockwise	Increased signal or noise is heard.	Check antenna connection and Cord CG–67/MRQ–2 or RF Cable Assembly CG–557A/U.
23	Rectifier RA–87–(*)	ON-OFF switch	Set to ON position		
24	Receiving Teletypewriters TT–55/MGC.	Power switch	Set to ON position	Motor runs	Check power selector switch for correct position.
					Check power and plug.
				Machine runs closed	Check adjustment of frequency-shift converter (TM 11–5820–202–10.)
	or				
25	Receiving Teletypewriter TT–4A/TG.	MOTOR switch	Set to ON	Motor runs	Check MOTOR FUSE.
					Check motor stop.
					Check power source for correct power.
					Check power cord and plug.
				Machine runs closed	Check LINE FUSE and the D. C. MILLIAMMETER for 60-ma reading.
					Check black and red shell plugs and line signal cords. See that the line signal cords are plugged into the proper jacks of the RTT control jacks.

START

c. *Radio Set AN/GRC–26(*) (excluding Radio Set Control Group AN/GRA–14)*—Continued.

	Step	Unit	Item	Action or condition	Normal indication	Corrective measures
START	26	Sending Teletypewriter TT–55/MGC.	POWER switch	Set to ON	Motor runs; machine runs closed.	Check TT power selector switch for correct 50–60 cycle position.
						Check ac cord.
		or				Verify that left TT–55/MGC switch is set at SEND.
	27	Sending Teletypewriter TT–4A/TG.	MOTOR switch	Set to ON	Motor runs	Check MOTOR FUSE.
						Check power source for correct power.
						Check power cord and plug.
					Machine runs closed	Check LINE FUSE and D.C. MILLIAMMETER for 60-ma reading.
						Check black and red shell plugs and line signal cords.
						Check to see that the line signal cords are plugged into the proper RTT control jacks (TM 11–5820–202–10 figs. 22–24).
	28	Typing reperforator (part of Perforator Transmitter TT–56/MGC).	MOTOR switch	Set to ON (down)	Motor runs. Machine runs closed.	Check motor connection box ac cord.
						See TM 11–2223.
		or				Check Rectifier RA–87–A*.
						Check send and receive cords of perforator.
						Check Special Purpose Cable Assembly CX–1120/U.
	29	Teletypewriter Reperforator-Transmitter TT–76/GGC.	POWER ON-OFF switch	Set to ON.		
			SELECTOR switch	Set to TD SEND-TR LOCAL PUNCH position.		
			MOTOR switch	Set to ON	Motor runs; machine runs closed.	Check fuse. Check power cord. Check brushes. Check switch positions. Higher echelon maintenance required.
			LIGHT switch		Copy lamp lights	Check lamp.
	30	Transmitter-distributor (part of Perforator-Transmitter TT–56/MGC).	MOTOR switch	Set to ON	Motor runs	Check power fuse. Check power source. Refer to troubleshooting chart in TM 11–2222.

START						
			STOP-SEND switch	Set to SEND	TD transmits message on test tape or if no tape is nstalled, it sends repeated combination letters.	Check clutch magnets (TM 11–2222).
EQUIPMENT PERFORMANCE	31	Frequency Shift Exciter 0–39(*)/TRA–7.		All dials and controls set in accordance with charts. TEST key set at MARK or SPACE.		
			BUFFER TUNING control.	BUFFER TUNING dial rotated in either direction.	BUFFER INDICATOR lamp glows with maximum brilliance when BUFFER TUNING dial is tuned to resonance.	Check lamp. Check tubes V101 and V102. Higher echelon maintenance required.
			TEST key	With transmitter alined to exciter frequency and transmitter switch on teletypewriter control unit in XMTR ON position: Set to MARK; set to SPACE; set to NORM.	BUFFER INDICATOR lamp glows and normal meter readings are observed on the transmitter in all three positions.	Retune frequency-shift exciter (TM 5820–202–10).
			Headset	Insert phones plug into PHONE 850 ~ TEST jack; remove Cord CX–2481/U from radio set control unit and insert into FREQ METER IN jack on the frequency shift exciter; and set VOLUME 850 ~ TEST control to midposition.		Check tube V107 and V108. Higher echelon maintenance required.
			TEST OSC switch	Operate to 850 ~ position	850-cps tone heard in phones.	Higher echelon maintenance required.
			VOLUME control (850 ~ TEST).	Rotate in either direction	Level of 850-cps tone will vary.	Check tubes V107 and V108. Higher echelon maintenance required.
			OSCILLATOR TUNING control.	TEST OSC switch in OFF position. TEST key in MARK position. Set one receiver as frequency standard (TM 11–5820–202–10).		

c. Radio Set AN/GRC–26(*) (excluding Radio Set Control Group AN/GRA–14)—Continued.

EQUIPMENT PERFORMANCE

Step	Unit	Item	Action or condition	Normal indication	Corrective measures
31	Frequency Shift Exciter 0–39(*)/TRA–7.		Rotate OSCILLATOR TUNING dial in either direction.	Zero beat obtained in phones when exciter is tuned to operating frequency.	Higher echelon maintenance required.
		TEST key	Operate to SPACE position.		
		TEST OSC switch	TEST OSC switch in 850 ~ position.		
		SHIFT DIAL	Rotate SHIFT dial very slightly in either direction (do not exceed ±6 divisions from chart indication).	Audio tone heard with 850-cps tone. Second tone varies in frequency as SHIFT dial is adjusted, and zero beat (slow flutter) is obtained when properly adjusted.	Retune frequency-shift exciter. Higher echelon maintenance required.
			Transmitter alined to exciter frequency.	This point is also indicated on 850 ~ TEST indicator tube by very slow flutter of shadow angle.	
32	Radio Transmitter BC–610–(*).	EXCITATION METER	TEST key on exciter unit set to MARK.		
			EXCITATION METER SWITCH set to DOUBLER PLATE; INT. AMP. GRID; INT. AMP. PLATE; P. A. GRID.	EXCITATION METER reads 25 to 45 ma; 1 to 8 ma; 125 to 175 ma; 60 to 100 ma.	If the meter does not indicate in any position, check Cord CX–961/TRA–7 (red). Check installation and tuning of the tuning unit. Check the setting of the BAND SWITCH. The M. O.–XTAL switch on the tuning unit, should be in XTAL position. If the meter readings are improper, retune the transmitter; replace tube V8, V9, V10, or V11, if necessary. Check fuse FS4.
		P. A. PLATE meter	TEST key on exciter set to MARK.	200 to 300 ma	Check tuning of P. A. PLATE TUNING control. Check plate coil and the position of the link.

					Check Cord CX–961/TRA–7 (blue).
					Operate the overload relay reset switch.
					Check fuses FS1, FS2, and FS3.
					Check all interlock switches.
					Replace V6, V7, or V16, if necessary.
33	Frequency Shift Converter CV–182(*)/GRC–26A.	—400-volt supply	METER B switch in —400V position.	Meter B indicates between 65 and 95 to the *left*.	Check V303. Check wiring. Higher echelon maintenance required.
		—150-volt supply	METER B switch in —150V position.	Meter B indicates between 20 and 40 to the *left*.	Check V302. Check wiring. Higher echelon maintenance required.
		Regulated —150-volt supply.	METER B switch in REG —150V position.	Meter B indicates between 20 and 40 to the *left*.	Check V303 and V306. Higher echelon maintenance required.
		Regulated +150-volt supply.	METER B switch in REG +150V position.	Meter B indicates between 20 and 40 to the *right*.	Check tubes V304 and V305. Higher echelon maintenance required.
		±275-volt supply	METER B switch in +275V position.	Meter B indicates between 50 and 70 to the *right*.	Check tube V301. Higher echelon maintenance required.
		Input signal	METER B switch in INPUT position.	Peak indication on meter B of 100 to the *right*.	Increase receiver volume. Retune receivers (TM 11–5820–202–10.)
		Neutral loop current	METER B switch in NEUTRAL position.	Meter B indicates 60 to the *right* for mark signals, 0 for space.	Adjust NEUTRAL OUTPUT control. Check V11 and V113. Higher echelon maintenance required.
		Polar loop current	METER B switch in POLAR position.	Meter B indicates 25 to the *right* (.025 amp) for mark signals, and 25 to the *left* for space signals.	Adjust POLAR OUTPUT MARK and SPACE controls. Higher echelon maintenance required.
		Channel A+B signal	METER B switch in CHAN A+B position.	Drift compensator out: Meter B indicates 100 to the *right* (mark) and to the *left* 100 (space).	Check tubes V111 through V114. Higher echelon maintenance required.
				Drift compensator in: Meter B indicates 70 to the *right* (mark) and 70 to the *left* (space).	Adjust DRIFT COMPENSATOR LIMITER control.

c. *Radio Set AN/GRC–26(*) (excluding Radio Set Control Group AN/GRA–14)*—Continued.

	Step	Unit	Item	Action or condition	Normal indication	Corrective measures
EQUIPMENT PERFORMANCE	33	Frequency Shift Converter CV–182(*)/GRC–26A.	Output of channel B discriminator.	METER B switch in CHAN B position, receiver A volume reduced.	Meter B indicates ± 50 for steady mark signal; averages 0 for miscellaneous signals.	Check tuning of CHANNEL B, FINE TUNING control and tuning of receiver B. (Frequency shift of transmitter may not be 850 cps.)
			Output of channel A discriminator.	Receiver B volume reduced.	Meter A indicates ±50 for a steady mark signal; averages 0 for miscellaneous TT signals.	Check tuning of CHANNEL A FINE TUNING control and tuning of receiver A. (Frequency shift of transmitter may not be 850 cps.)
			Diversity output of channel A and B discriminators.	METER B switch in CHAN B position.	Reading on meter A will exceed reading of meter B about 50 percent of the time when steady mark signal is received.	Refer to troubleshooting chart in TM 11–5062.
			Drift compensator circuit	METER B switch in COMP AMP position, LIMITER control fully clockwise.	Minimum kicks on meter B while receiving signals.	Adjust AMP GAIN control for minimum meter kicks.
	34	Radio Receiver R–388/URR	ANT. TRIM control	Rotate	Maximum noise peaks or signal can be obtained.	Check antenna.
						Check Cord CD–67/MRQ–2.
			Tuning control	Adjust	Use for receiver tuning	Retune signal, using tuning control.
			BFO set to ON	Rotate BFO SWITCH control in either direction.	Beat note can be heard to pass through zero beat.	Refer to TM 11–5820–202–10.
			Loudspeakers	Set operating normally	Signal is heard	Check cable connections.
	35	Radio Teletypewriter Control C–808/GRC–26A.	Mark and space current	Set SPACE-MARK switch to MARK.	Meter should read 60 to the *right*.	Adjust MARK control to read 60.
			EXTENSION - NORMAL switch in NORMAL position.	Set SPACE-MARK switch to SPACE. *Note.* SPACE-MARK switch must be returned to MARK position for normal operation.	Meter should read 75 to the *left*.	Adjust SPACE control to read 75.
	36	Receiving Teletypewriter TT–55/MGC.	TT TRANSPOSE switch set to LEFT REC. RIGHT SEND.	Set SPACE-MARK switch to MARK.	Left teletypewriter runs closed.	See that the left teletypewriter switch is set at REC. Check jacks and plugs on left TT.

		TT TRANSPOSE switch to LEFT REC. RIGHT SEND.	Set SPACE-MARK switch to SPACE.	Left teletypewriter runs open.	Refer to trouble-analysis chart in TM 11–352.
		Manual carriage return lock bar.	Press carriage return lock bar.	Carriage returns to left side of machine.	Refer to trouble-analysis chart in TM 11–352.
	or				
37	Receiving Teletypewriter TT–4A/TG.	TT TRANSPOSE switch set to LEFT REC-RIGHT SEND.	Set SPACE-MARK switch to MARK.	Left teletypewriter runs closed.	Check to see that signal line plugs are in the proper jacks of the teletypewriter control unit. Check signal line cords and plugs.
		TT TRANSPOSE switch set to LEFT REC-RIGHT SEND.	Set SPACE-MARK switch to SPACE.	Left teletypewriter runs open.	Refer to trouble-analysis chart in TM 11–2234.
38	Sending Teletypewriter TT–55/MGC.	BREAK key	Press BREAK key momentarily.	TT control meter indicates 60 to the left of zero.	Adjust line current to 60 ma.
		Space bar	Hold space bar down momentarily.	Carriage travels to right and stops when released.	Refer to trouble-analysis chart in TM 11–352.
		Test message	SEND-REC-BREAK switch in SEND position. Type out test message on keyboard.	Machine prints test message.	Refer to trouble-analysis chart in TM 11–352.
	or				
39	Sending Teletypewriter TT–4A/TG.	BREAK switch	Press button	RTT control meter indicates 60 to the left of zero.	Check line circuit fuse. Adjust line current for 60 ma. Refer to trouble-shooting chart in TM 11–2234.
		Space bar	Hold bar down momentarily.	Carriage travels to right and stops when released.	Refer to troubleshooting chart in TM 11–2234.
		Manual carriage return lock bar.	Press bar	Carriage returns to left side of machine.	Refer to troubleshooting chart in TM 11–2234.
		Test message	Type out message on keyboard.	Machine prints message	Check selector-magnet. Refer to troubleshooting chart in TM 11–2234.
40	Typing reperforator (part of Perforator-Transmitter TT–56/MGC).	LINE BREAK KEY	Press	Machine runs open	Refer to trouble-analysis charts for typing reperforators in TM 11–2223.
			Release	Machine runs closed.	
		Space bar	Hold down for 10 seconds	Signal lamp lights indicating end of line.	Press LINE FEED and CAR RET keys.

c. *Radio Set AN/GRC–26(*) (excluding Radio Set Control Group AN/GRA–14)*—Continued.

EQUIPMENT PERFORMANCE

Step	Unit	Item	Action or condition	Normal indication	Corrective measures
40	Typing reperforator (part of Perforator-Transmitter TT–56/MGC).	CAR RET keys	Press	Lamp goes out	Check lamp. Refer to trouble-analysis chart in TM 11–2223.
		Test message	Type test message on keyboard.	Tape is printed and perforated correctly.	Refer to trouble-analysis chart in TM 11–2223.
		Transmitter-distributor tight-tape stop lever.	Place tight-tape stop lever in down position.	Tape moves through the transmitter-distributor.	
			Raise tight-tape stop lever	Tape stops.	
41	Teletypewriter Reperforator-transmitter TT–76/GGC.	BREAK pushbutton	Press and release	Machine runs open; machine runs closed.	Check button. Refer to TM 11–2225.
		Space bar	Hold down for 10 seconds	END OF LINE INDICATOR lamp lights, on 66th character.	Check lamp. Check adjustment of lamp switch contacts. Refer to keyboard-transmitter troubleshooting chart (TM 11–2225).
		LINE FEED and CAR RET keys.	Press successively	END OF LINE INDICATOR lamp goes out.	
		Test message	Type test message on keyboard (with KEYBOARD switch in SEND position).	Tapes are printed and punched correctly.	
42	Transmitter-distributor (part of Perforator-Transmitter TT–56/MGC).	Transmitter-distributor test tape.	Place test tape and lock in TD and send.	Same message appears on the TT in the line circuit, if SEND-REC-BREAK key is at REC.	
	or				
43	Tape transmitter (part of Teletypewriter Reperforator-Transmitter TT–76/GGC).	Test tape	Place in tape guide and lock tape guide cover.		
		START-STOP lever	Place in START position	Tape feed test message printed on TTY machine in line circuit.	Refer to equipment performance checklist in TM 11–2225.
44	Equipments (final adjustment).	Send test message by prearrangement with distant station.	Test message should be printed correctly on receiving TT at distant station.		
		Tune receivers to distant station. Have distant station send test message.	Test message from distant station should be printed correctly on receiving TT as well as on sending TT at distant station.		

STOP

45	Typing reperforator (part of Perforator-Transmitter TT–56/MGC).	MOTOR switch	Set to OFF position	Motor stops	Check MOTOR switch.
		Transmitter-distributor STOP-SEND switch.	Set to STOP position	Stops feeding tape through transmitter-distributor.	Check STOP-SEND switch.
		Transmitter-distributor MOTOR switch.	Set to OFF position	Motor stops	Check MOTOR switch.
	Teletypewriter Reperforator-Transmitter TT–76/GGC with tape transmitter.	MOTOR switch	Set to OFF position	Motor stops	Check MOTOR switch.
		START-STOP lever	Set to STOP position		Check lever operation.
46	Teletypewriter TT–55/MGC	Teletypewriter power switch	Set to OFF position	Motor stops	Check power switch.
		SEND-REC-BREAK key	Set to BREAK position	Transmission stops.	
47	Teletypewriter TT–4A/TG	MOTOR switch	Set to OFF	Motor stops	Check MOTOR switch.
		BREAK switch	Press button	Transmission stops	Check BREAK switch. Refer to TM 11–2234.
48	Radio Teletypewriter Control C–808/GRC–26A.	XMTR ON-XMTR OFF switch.	Set to XMTR OFF. TEST key of exciter unit in NORM position.	Green TRANSMITTER indicator lamp should go out. Transmitter plate power goes off.	Check switches S6 and S5. Check to see that switch S6 in transmitter is off (down).
		Power switch	Set to OFF positior	AC SUPPLY indicator lamp should go out.	Check switch S7.
49	Rectifier RA–87–A	Power switch	Set to OFF position		Check power switch.
50	Radio Receiver R–388/URR	OFF-STANDBY-ON switch.	Turn to OFF position	Dial lamp goes out	Check switch S113.
51	Power Supply PP–712(*)/GRC–26A.	PLATE power switch	Set to off (down) position	Red-capped pilot lamp goes out.	Check switch S304.
		AC SUPPLY switch	Set to off (down) position	White-capped pilot lamp goes out.	Check switches S301, S302, and S303.
52	Radio Transmitter BC–610–(*).	FILAMENT POWER switch.	Set to off (down) position	White light goes out and power to filament is removed.	Check switch SW1.
53	Frequency shift Exciter	TEST key	Set to NORM	BUFFER INDICATOR lamp goes out.	Check switch S104.
			XMTR ON-XMTR OFF on TT control set at XMTR OFF.	Green lamp goes out.	
		AC SUPPLY and OVEN switches.	Set at off (down)	Lamp goes out. Oven lamp goes out. (Oven lamp is operated by a thermostatically-controlled switch.)	Check switches S105 and S108.
54	Electrical Equipment Cabinet CY–1216/U, blower assembly.	Blower switch	Set to OFF position	Indicator lamp goes out and blower stops.	Defective switch in blower assembly.
55	Shelter S–69/GRC	Circuit breakers	Set at OFF	Shelter lights go out	Check circuit breaker.
56	Power Unit PE–95–G	CIRCUIT BREAKER switch.	Set at off position		Refer to troubleshooting chart in TM 11–904.
		STOP button	Press STOP button firmly until engine stops.	Engine stops. AC VOLTS meter indicator decreases to 0.	

a. Radio Set Control Group AN/GRA–14. Before troubleshooting by use of the following equipment performance checklist, be sure that all other components for the radio set are operating according to the check list in *c* above.

	Step	Unit	Item	Action or condition	Normal indications	Corrective measures
PREPARATORY	1	Radio set control unit	ON-OFF switch	Set in OFF position.		
			TELEPHONE switch	Set in LOCAL position.		
			ONE WAY-DUPLEX switch.	Set to ONE WAY position.		
			TELETYPE switch	Set in LOCAL position.		
	2	Remote switching control unit.	ON-OFF switch	Leave in OFF position.		
	3	Teletypewriter control	XMTR ON-XMTR OFF switch.	Leave in XMTR OFF position.		
			FULL DX-ONE WAY switch.	Set in ONE WAY position.		
	4	Frequency-shift exciter	TEST switch	Set in NORMAL position.		
EQUIPMENT PERFORMANCE	5	Local and remote telephones	Ringing generators	In turn, crank each generator.	Ringing signals heard at local and remote sites.	Check continuity of telephone lines with multimeter. Refer to troubleshooting chart in TM 11–333; check local and remote units. Higher echelon maintenance required.
	6	Local and remote telephones	Handsets	In turn, press each handset switch and speak into microphone.	Conversation possible between shelter and remote site.	Refer to step No. 5.
	7	Radio set control unit	ONE WAY-DUPLEX switch.	Operate to DUPLEX position.		
			ON-OFF switch	Operate to ON position	RECEIVE and LOCAL TELETYPE lamps light.	Check lamps by substituting spare. Higher echelon maintenance required.
	8	Remote SEND DUPLEX teletypewriter.	Keyboard	Type message	Message recorded on send machine in shelter.	Check continuity of field wires connecting TELETYPE LINE 2 binding posts on local and remote units. Check cables connecting local control unit to teletypewriter control and to frequency-shift conyerter. Higher echelon maintenance required.

EQUIPMENT PERFORMANCE

					Refer to manual for teletypewriter.
9	Send teletypewriter in shelter.	Keyboard	Type message	Message recorded on SEND DUPLEX machine at remote site.	Higher echelon maintenance required.
10	Radio set control unit	ONE WAY-DUPLEX switch.	Set to ONE WAY position.		
		TELETYPE switch	Set to RADIO position	LOCAL TELETYPE lamp goes out.	Higher echelon maintenance required.
11	Receiver	Receiver	Tune in radioteletypewriter signal.	Receive signal recorded by receive machines at shelter and remote site.	Higher echelon maintenance required.
12	Remote switching control unit.	OFF-ON switch	Set to ON position	TRANS lamps on both control units light.	Check lamps by substituting spare. Check power cord. Higher echelon maintenance required.
				Receiver is disabled	Check cable between C808 J11 connector on local control unit and teletypewriter control.
				Transmitter is enabled	Check cable between C808 J14 connector on local control unit and teletypewriter control.
				RECEIVE lamp on local control unit goes out.	Higher echelon maintenance required.
13	Remote send teletypewriter	Keyboard	Type message	Message transmitted by transmitter.	Higher echelon maintenance required. Higher echelon maintenance required.
14	Radio set control unit	TELEPHONE switch	Operate to RADIO position.		
15	Local telephone	Handset	Press handset switch and speak into mouthpiece.	Voice transmitted by transmitter.	Higher echelon maintenance required. Check cable from BC–614 J102 jack on the local control unit to speech amplifier. Refer to TM 11–5054.
16	Remote telephone	Handset	Press handset switch and speak into mouthpiece.	Voice transmitted by transmitter.	Higher echelon maintenance required. Check wire between CONTROL AND TEL LINE terminals of the remote and local control units.

Radio Set Control Group AN/GRA–14.—Continued

	Step	Unit	Item	Action or condition	Normal indication	Corrective measures
EQUIPMENT PERFORMANCE	17	Remote switching control unit.	ON-OFF switch	Set to OFF position	TRANS lamps on both control units go out. Receiver is enabled. Transmitter is deenergized.	Higher echelon maintenance required.
					RECEIVE lamp on local control unit lights.	Higher echelon maintenance required.
					Incoming signals heard in receivers of local and remote telephones.	Refer to troubleshooting chart in TM 11–333.
	18	Radio set control unit	ONE WAY-DUPLEX switch.	Set to DUPLEX position	Transmitter is enabled. TRANS lamp on local control unit lights.	
					Radioteletype and radiotelephone signals may be transmitted and received at the same time at either the local or remote sites.	Higher echelon maintenance required.
			TELETYPE switch	Operate to LOCAL position	Transmitter is deenergized. LOCAL TELETYPE lamp lights.	
					TRANS light on local control unit goes out.	Higher echelon maintenance required.
	19	Frequency-shift exciter	TEST switch	Operate to MARK position	Transmitter is enabled	Higher echelon maintenance required.
					Full-duplex radiotelephone communication may be carried out with full-duplex teletypewriter local communication.	Higher echelon maintenance required.
	20	Radio set control unit	HYBRID BALANCE control.	With receiver tuned to steady carrier and beat-frequency oscillator on, turn HYBRID BALANCE control in both directions. Return control to position giving minimum indication on meter.	Meter indication on speech amplifier varies.	Higher echelon maintenance required.

	21	Frequency-shift exciter	TEST switch	Return to NORMAL position.	Transmitter is deenergized	Refer to step No. 19.
STOP	22	Radio set control unit	ON-OFF switch	Operate to OFF position	RECEIVE and LOCAL TELETYPE lamps go out. Radio set will operate as if control group were not installed.	

8. Tube Testing and Replacement

When trouble is reported, check all control settings, cabling, and connections before testing any tubes. Figure 6 is a tube location diagram of the teletypewriter control unit. If failure is suspected, use Electron Tube Test Set TV–7/U, or equivalent, and check the tubes as follows:

a. Testing Techniques.

(1) *Using tube tester.* Prepare the tube tester for use in accordance with the instructions given in TM 11–5083, and the test data (TB 11–5083–1) on the inside cover of the tube tester. Remove and test one tube at a time.

(2) *Tube substitution method.* Replace a suspected tube with a new tube. If this does not correct the trouble, remove the new tube and replace the original one Repeat this procedure with each suspected tube until the defective tube is located.

Caution: **Never rock or rotate a tube when removing it from the socket; pull it straight out with a tube puller.**

b. Tube Disposal. Discard a tube only if its defect is obvious or if the tube tester shows it to be defective. Do not discard a tube that tests at or slightly above the minimum test limits.

9. Voltage and Resistance Measurements

To localize trouble within a particular circuit, make tube socket voltage and resistance measurements. Tube Socket Adapter Kit MX–1258/U provides test adapters that permit voltage and resistance measurements from the top of the chassis. Use Multimeter AN/URM–105, or equivalent, to make the measurements. When the trouble has been localized, record on the repair tag the improper measurement, tube reference designation, pin number, and the panel or assembly on which the tube is located.

Warning: **Disconnect all sources of voltages before measuring tube socket resistances. When**

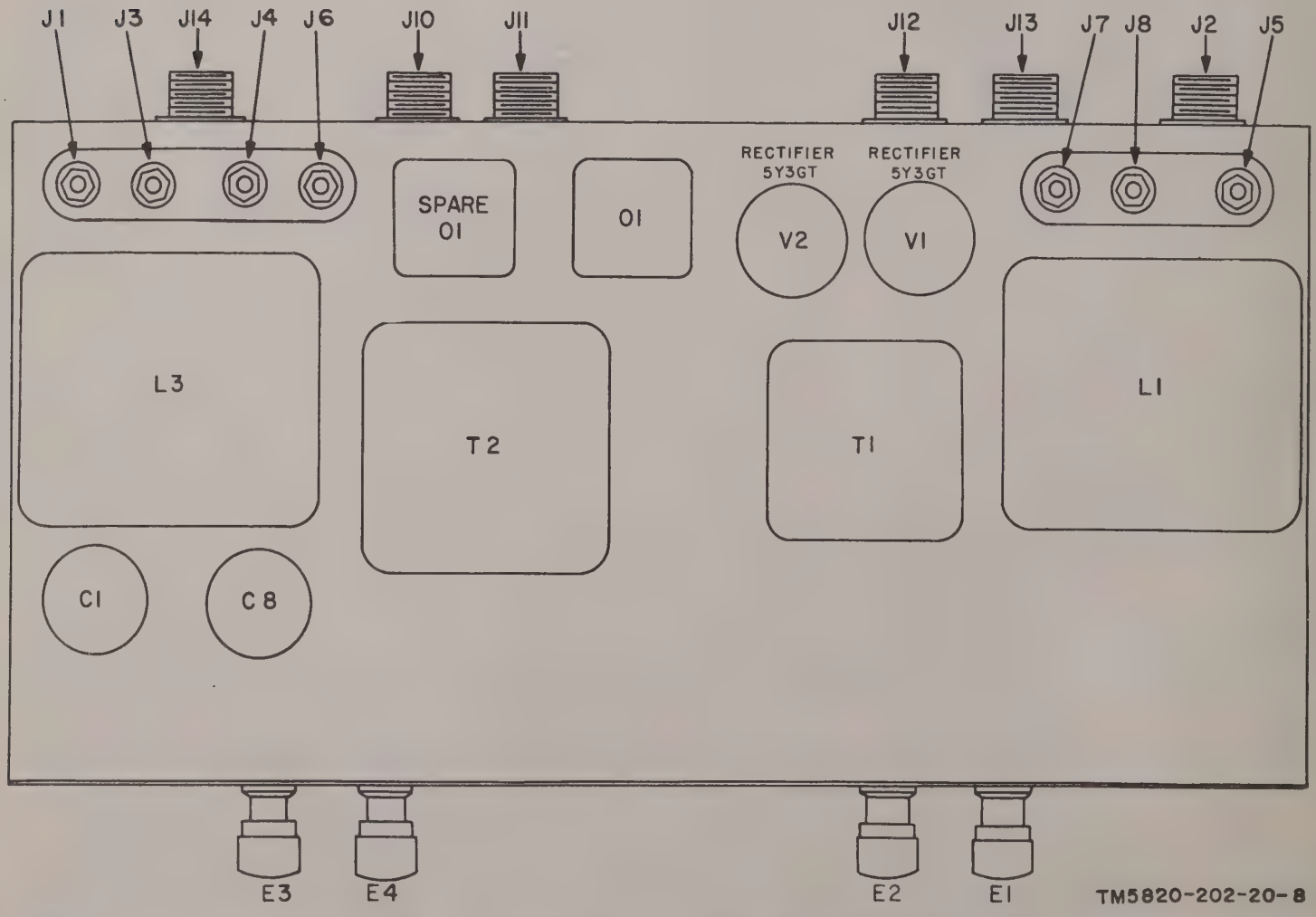


Figure 6 Radio Teletypewriter Control C–808/GRC–26A or Transmitter-Teletypewriter Control C–808A/GRC–26A, tube location diagram.

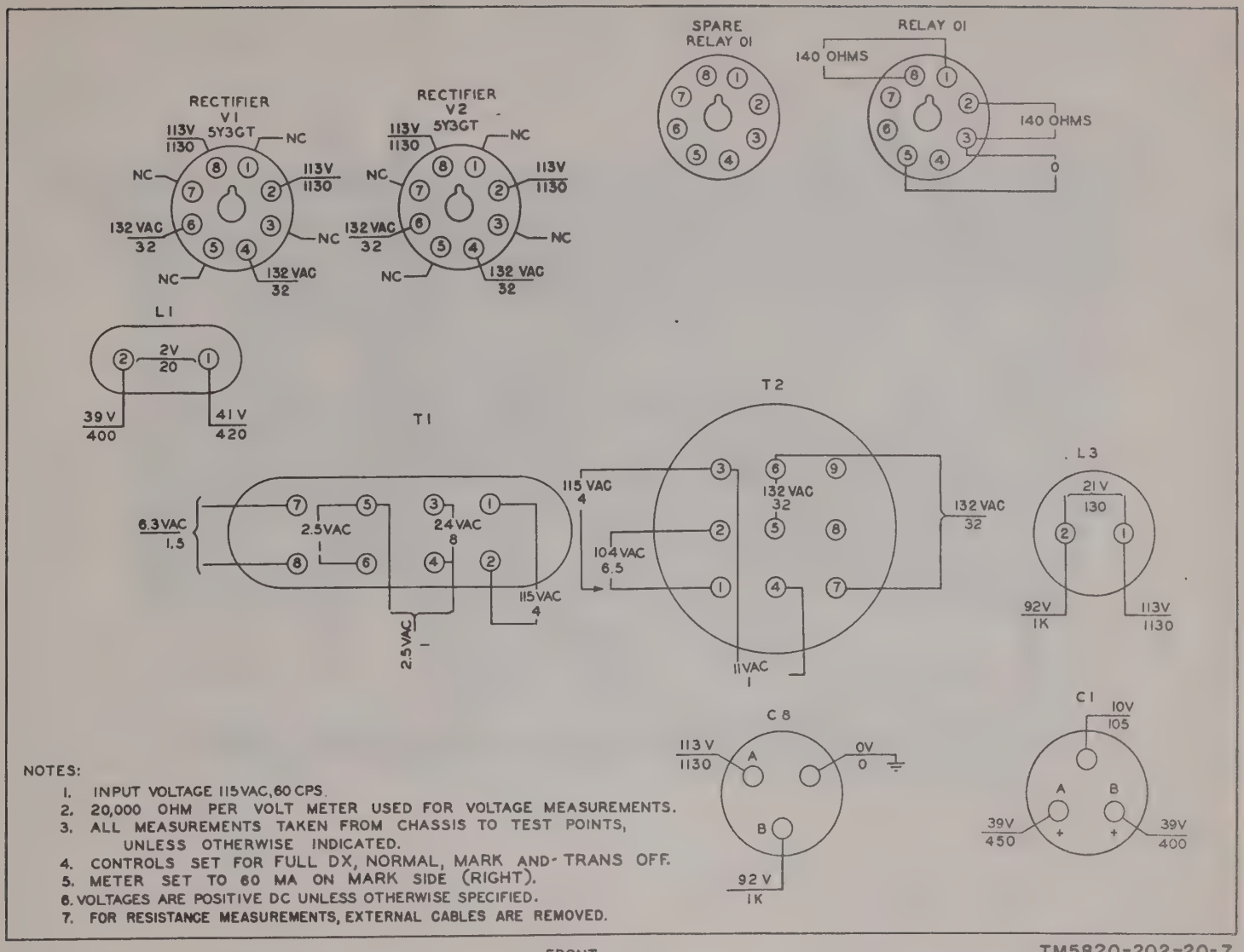


Figure 7. Radio Teletypewriter Control C–808/GRC–26A or Transmitter-Teletypewriter Control C–808A/GRC–26A, voltage and resistance measurements.

the power is disconnected, some capacitors may still retain dangerous voltages. Short-circuit the capacitors to ground.

a. Use of Test Adapters. When using a test adapter, proceed as follows:

(1) Pull the tube straight out with a tube puller.

(2) Select the test adapter for the MX–1258/U which corresponds to the size and number of pins of the tube removed. Insert this test adapter into the tube socket.

(3) Insert the tube removed in the test adapter.

(4) Make the desired measurements by connecting the meter probe to the terminal on the test adapter corresponding to the pin number on the tube.

(5) When the tests are completed, remove the test adapter and replace the tube.

b. Voltage and Resistance Diagram. Figure 7 is a voltage and resistance measurement diagram of Radio Teletypewriter Control C–808/GRC–26A. Voltage and resistance diagrams for the other major components of the radio set are contained in their respective technical manuals.

c. Cord Resistances. The resistance of cords and cable assemblies used in the radio set is less than 1 ohm in all cases except Cord CG–389/U. This cord will indicate infinite resistance because it contains a series capacitor.

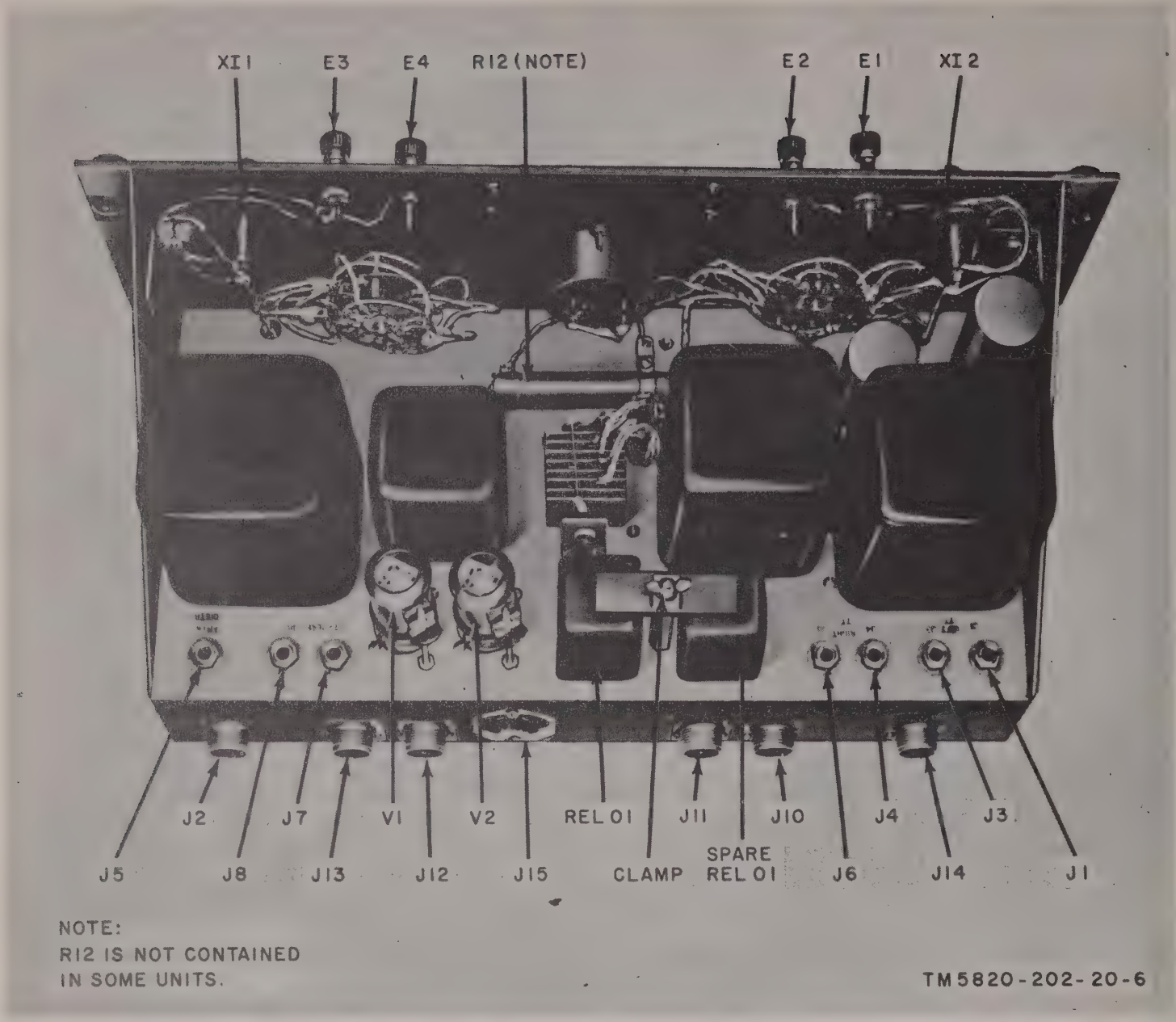


Figure 8. Radio Teletypewriter Control C–808/GRC–26A or Transmitter-Teletypewriter Control C–808A/GRC–26A, top view of chassis.

10. Radio Teletypewriter Control C–808/GRC–26A or Transmitter-Teletypewriter C–808A/GRC–26A, Voltage and Resistance Measurements

(fig. 7)

a. Voltage readings are taken with the cables connected between the teletypewriter control unit and the frequency shift exciter, and between the teletypewriter control unit and the radio set control unit (with the frequency shift converter and the speech amplifier connected to it). The teletypewriter equipments are connected to the proper jacks on the teletypewriter control unit (TM 11–5820–202–10, figs. 23–25). Set the power switch to ON, the XMTR ON-XMTR OFF switch to XMTR ON, the FULL DX-ONE WAY switch to FULL DX, the SPACE-MARK switch to MARK, and the EXTENSION-NORMAL switch to NORMAL.

b. The resistance readings are taken with all external cables disconnected.

11. Replacement of Parts

a. When replacing defective parts, tag the leads so that the connections to the terminals of the replaced parts will be made correctly. Do not use too much solder. If some of the solder runs off the connection, be sure to remove it since a

short circuit may be caused if it lodges between adjacent terminals. Make sure that terminals are hot enough when the solder is applied. Cold soldered connections make poor ones and may open. A high resistance connection may result from a cold solder connection.

b. Most of the parts in Radio Teletypewriter Control C–808/GRC–26 and Radio Set Control Group AN/GRA–14, which may need to be replaced, use standard mounting devices. No special knowledge is required to remove these devices. Relay 0 1, in the teletypewriter control unit, is a plug-in relay. To remove it, loosen the wingnut which holds the strap across the relay and unfasten the strap. Remove the relay from its socket and replace it with one that is good. Replace the strap and tighten the wingnut.

c. For replacement of parts of all other components, refer to their respective technical manuals (TM 11–5820–202–10).

CHAPTER 2
THEORY

Section I. GENERAL THEORY

12. Introduction

a. This chapter describes the general and system theory of Radio Set AN/GRC–26(*). The information presented is intended to aid the organizational repairman in maintaining the radio set. Technical manuals have been published which cover the theory of all the major components of the radio set except Radio Teletypewriter Control C–808/GRC–26A and Radio Set Control Group AN/GRA–14 (TM 11–5820–202–10). The system theory of these units is given in paragraphs 17 and 18.

b. The radio set consists of a number of wire and radio equipments working as a unit. Since the primary use of the radio set is for radio-teletypewriter (RTT) communications, emphasis is placed on the adaptability of the equipment to this mode of operation.

13. Space Diversity Reception

a. Space diversity reception is designed to overcome the effects of fading radio signals. In high-speed RTT operation, even short variations in signal strength have a marked effect upon the accuracy of a message. Briefly, fading is caused by several factors, such as a shift in the height of the ionosphere and multipath signal transmission with the resulting out-of-phase recombination of the signal at the antenna. The most practical methods developed to reduce the effects of fading have been automatic gain control and frequency, polarization, and space diversity reception. Of these, space diversity reception is the most efficient for an RTT system.

b. A space diversity system is based on the assumption that instantaneous fading will not occur everywhere at one time. Therefore, if two receiving antennas are spaced several wavelengths apart, it is highly probable that a strong signal always will be received on at least one of them even though the signal at the other may be fading. Such a system is used in Radio Set AN/GRC–26(*); the major components required are two receiving antennas, two receivers (one for each antenna), a unit which combines the output of the receivers, and the associated equipment required for RTT operation.

14. Basic Circuits

a. Teletypewriter. Figure 9 shows the fundamental circuit used for operating two interconnected teletypewriter equipments on a one-way reversible (half-duplex) basis. Note that all components (including the source of current) are series-connected. This circuit is a *neutral* circuit since the transmission and reception of intelligence depend entirely on the make and break of the sending contacts, and on the energizing and de-energizing of the selector magnet coils. The condition of current flowing in any neutral circuit is known as a *mark* condition (A, fig. 9). Conversely, when the circuit is interrupted and no current flows, a *space* condition (B, fig. 9) results. A system of 5-unit coded, equal length signal impulses is used (fig. 10). The mark and space impulses are the same length. For each letter of the alphabet, plus certain punctuation and operating symbols, a combination of five mark and space impulses is used. The five impulses are transmitted by interrupting the current at equal intervals by means of electrically controlled contacts in the teletypewriter transmitting mechanism. In addition to the five impulses which make up the letter and symbol combinations, two other impulses are transmitted for each cycle representing the transmission of one character. These additional impulses are known as the *start* and *stop* impulses. The start impulse is always a *space* and is used to prepare the receiving mechanism for the reception of the character impulses which immedi-

ately follow it. The stop impulse is always a *mark* impulse, and it is used to stop the cycle of code transmission momentarily to insure that perfect synchronism exists between the transmitting and receiving mechanisms. Referring to figures 9 and 10, if the sending contact at station A were opened, then closed for two impulse intervals, then opened again for three impulse intervals, then closed again, the series current in the neutral circuit would be interrupted through the selector magnet winding and the armatures at both station A and station B would respond. These armatures actuate the printer mechanisms at both stations and the letter A would be printed on the page copy. If no other signal were transmitted, the sending mechanism would remain on the stop (closed) position, a continuous mark would be transmitted, both armatures would be held against the selector magnet, and the circuit would be idle; it would be *running closed*. In this condition, the receiving mechanisms are instantly available for receiving traffic, requiring only the transmission of a start impulse (space) for operation. Any interruption of the mark signal for a time interval longer than the specific interval assigned to a space impulse causes the circuit to *run open*.

Note. For full-duplex operation, two circuits are required. The send circuit for Station A consists of the send contact (Station A (A, fig. 9)) connected in series with the selector magnet (Station B) and the battery; the send circuit for Station B consists of the send contact (Station B (B, fig. 9)) connected in series with the selector magnet (Station A) and the battery. Full-duplex operation permits simultaneous from Stations A and B.

b. Radio Teletypewriter. Figure 11 is a simplified block diagram of an RTT system, showing the relationship of the teletypewriter equipments to the RF equipments.

(1) *Sending circuit.* The sending contacts of the transmitting teletypewriter equipment (which may be either a transmitter distributor or the keyboard of any teletypewriter or typing reperforator) are connected directly to the teletypewriter control unit and in series with a source

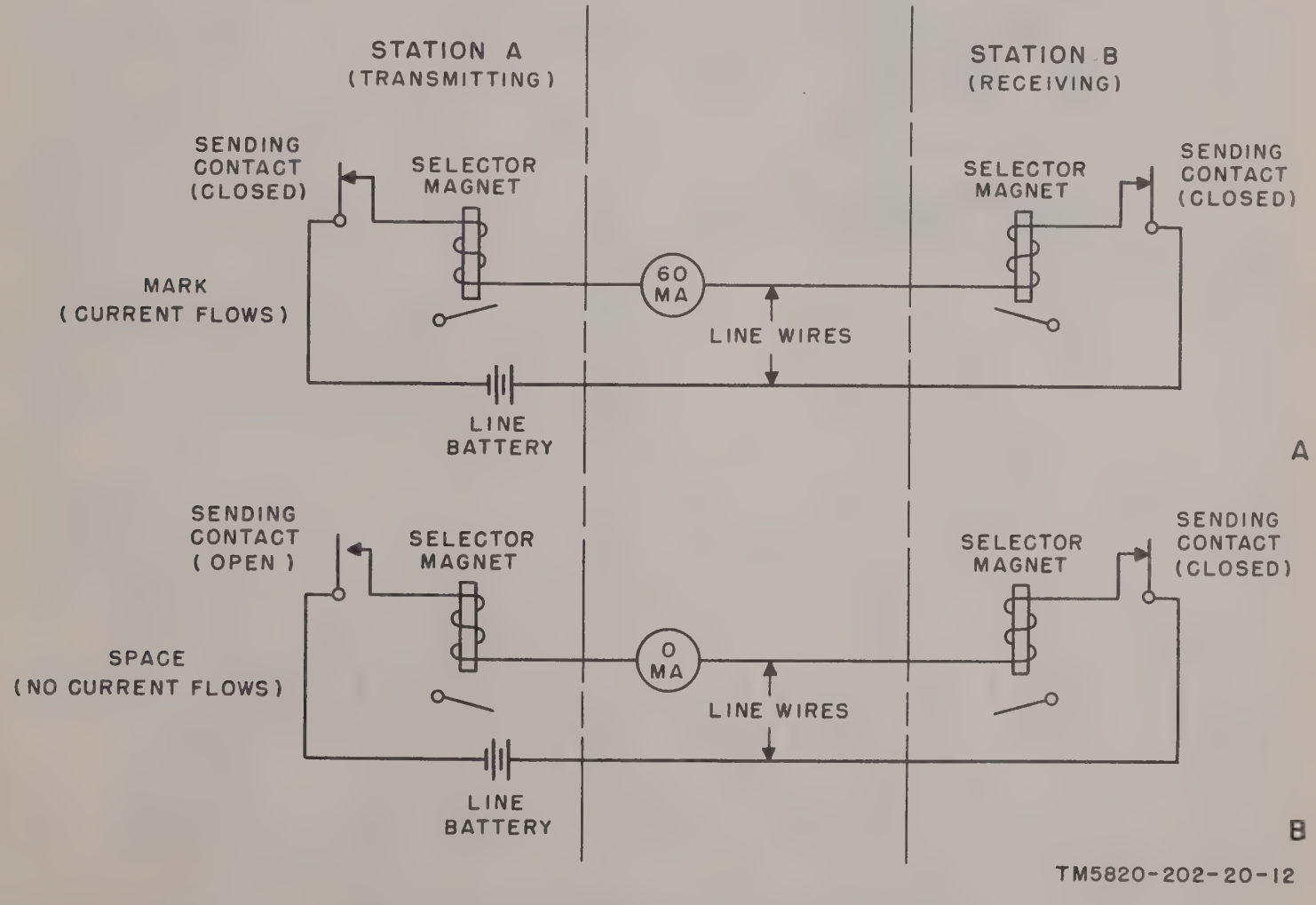


Figure 9 Basic teletypewriter circuit, schematic diagram.

of loop current, which must be 20 or 60 milliamperes (ma) for proper operation of the teletypewriter equipments. The teletypewriter control unit acts as a switching center for the teletypewriter equipments. The neutral signals initiated by the sending contacts are converted by the control unit to polar signals which excite the *RF transmitting* section of the system. This causes frequency-shift signals to be transmitted from the antenna. For every mark and space initiated by the sending contacts, the transmitted frequency shifts a specified amount. This frequency shifting is the radio means of conveying the intelligence contained in the teletypewriter signaling impulses.

(2) *Receiving circuit.* The frequency-shift signals sent out by the transmitting station are picked up by the receiving equipment section at station B. The signals are interpreted and transformed into neutral direct-current (dc) teletypewriter impulses which are applied through the control unit, and key the receiving teletypewriter selector magnet.

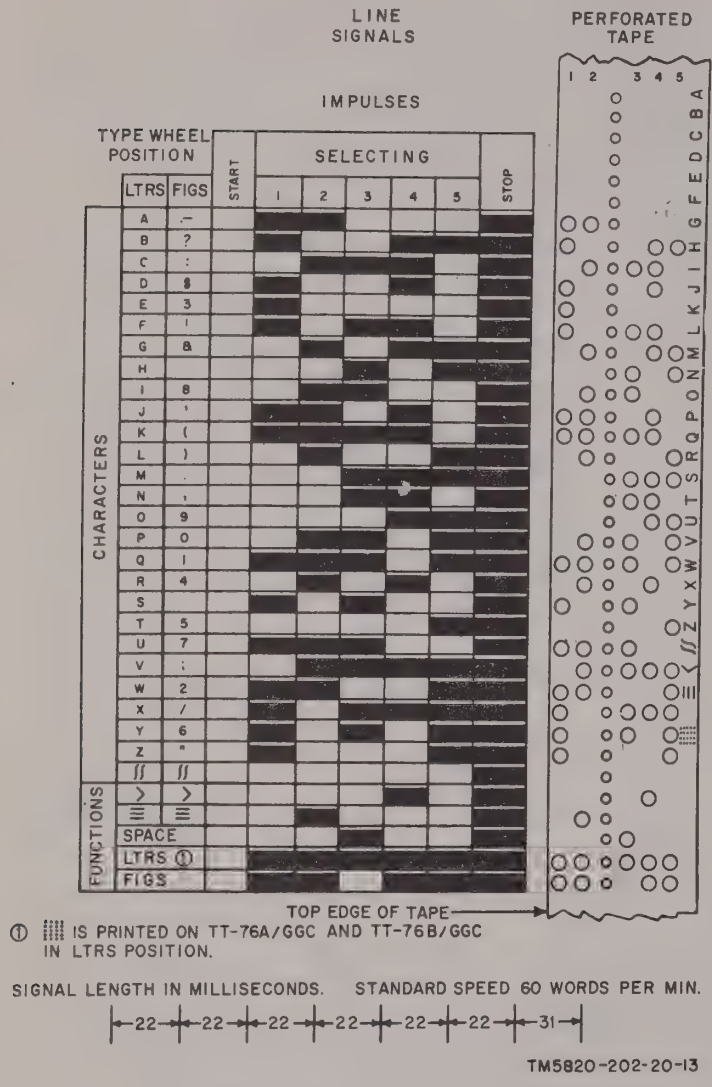


Figure 10. Teletypewriter code.

15. Impulse Distortion

Figure 9 shows the basic teletypewriter circuit components connected for use in a *neutral* circuit. A neutral circuit is one in which a pulse of current represents a *mark* impulse, and an equal interval of no current represents a *space* impulse. When the line circuits between the teletypewriter equipments are lengthened, various conditions arise to alter the electric characteristics of the lines. Increased line resistance reduces the series line current. In addition, line leakage, line capacity, and inductance are other factors which distort the waveform of the signal impulse; this distortion prevents operation of the teletypewriter printing

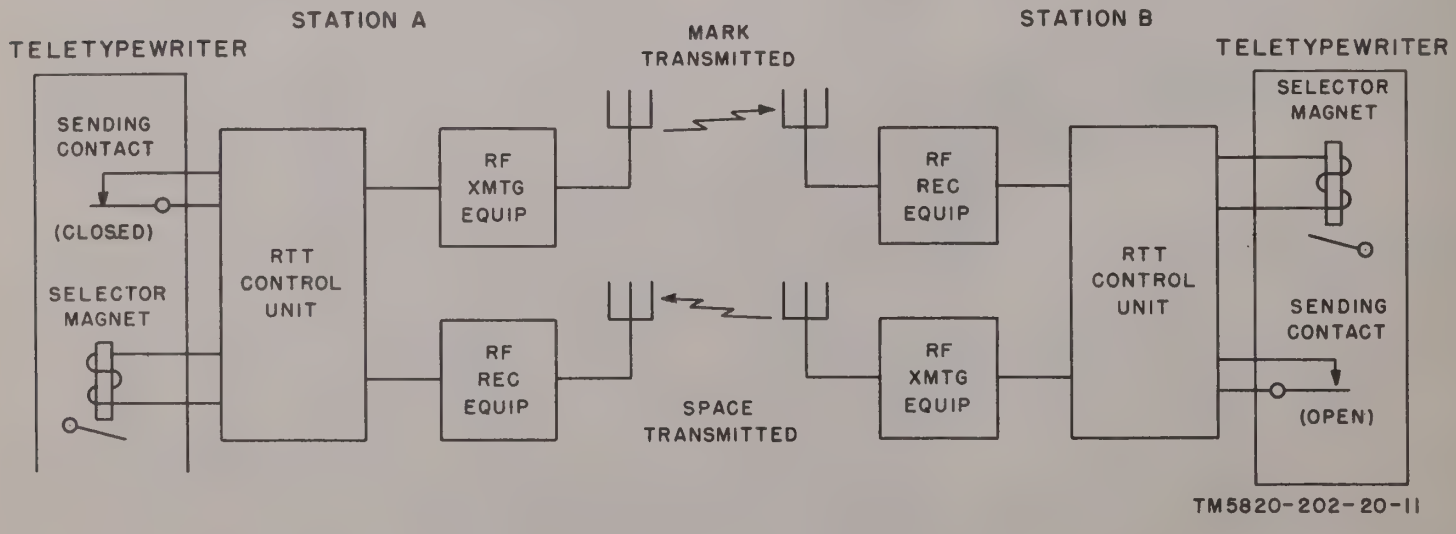


Figure 11. Basic RTT circuit block diagram.

mechanism which depends on uniform impulse length (fig. 12). An ideal pulse is a square wave, but line leakage, capacitance, and resistance all tend to alter the square wave by decreasing its effective length. Since the receiving mechanism must be synchronized accurately with the transmitting equipment, any decrease in pulse will cause errors in the printed copy. To minimize such faults, *polar* operation is used wherever long lines are encountered. Polar operation requires that current flow in one direction for a mark condition, and in the opposite direction for a space condition (fig. 13). The use of polar circuits assures that a transmitted wave shape which is a practical duplicate of the original pulse is received.

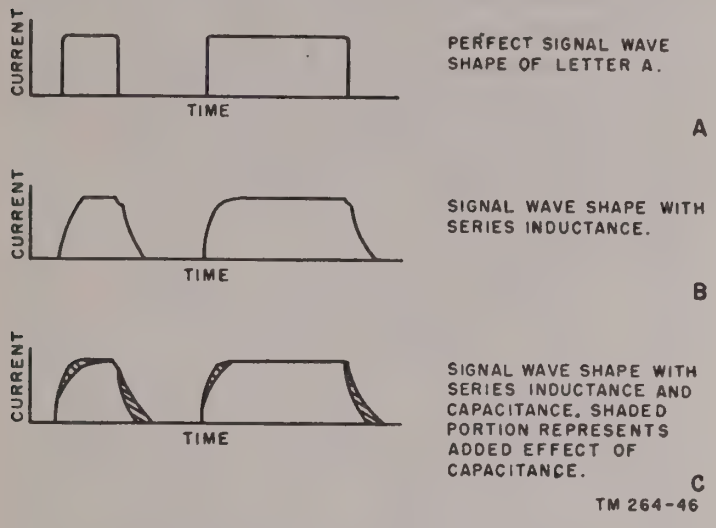


Figure 12. Neutral signal wave shapes.

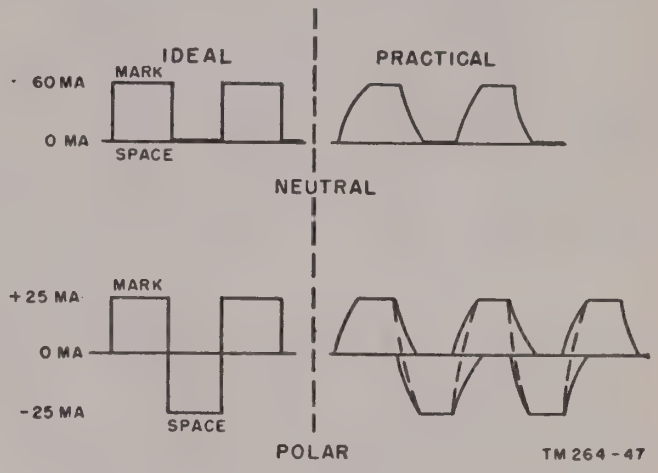


Figure 13. Neutral and polar wave shapes.

Section II. SYSTEM BLOCK DIAGRAM THEORY OF RADIO SET AN/GRC-26 (*)

16. General

a. Transmitting Direction. The transmitter is modulated by either audio, teletypewriter, or continuous-wave (cw) signals. Normally, the frequency of the transmitter is controlled by the frequency-shift exciter. When two frequencies are available for use, the full-duplex basis of operation can be used, and receiver disabling is unnecessary. However, when only one frequency is available, the one-way basis of operation (half-duplex) must be used. In this case, the transmitter must be disabled when receiving and the receivers must be disabled when transmitting. In paragraph 17, the block diagram analysis of the sending and receiving circuits is discussed.

b. Receiving Direction. The signals induced into the receiving antenna may be either frequency-shift modulated by teletypewriter signals or amplitude-modulated (am) by audio signals, or they may be both frequency-shift and amplitude-modulated simultaneously. Normally two doublet antennas (dual diversity reception) are used. Only frequency-shift reception is duscussed in the following block diagram analysis. For discussions of amplitude-modulated (am) and cw reception, refer to TM 11–854.

17. Radio Set AN/GRC–26(*), Block Diagram Analysis

a. Send Circuits.

(1) The waveforms and paths of the signals from the initiating transmitting teletypewriter equipment to the transmitting radio antenna are shown in the upper portion of figure 14. The transmitter-distributors (part of Perforator-Transmitter TT–56/MGC) is used for transmitting signals from prepared perforated tape of both the chad and the chadless type. The transmitter-distributor initiates neutral signals which are applied directly to Radio Teletypewriter Control C–808/GRC–26A (teletypewriter control unit). While the transmitter-distributor is used only for automatic transmission by tape, either the transmitting or receiving teletypewriter can be switched into the circuit by the teletypewriter control unit when required to send manual keyboard signals. The transmitting teletypewriter also prepares page copy of signals sent by keyboard or, if desired,

will prepare a page copy of any outgoing tape that is handled by the transmitter-distributor.

(2) The teletypewriter control unit accepts the neutral signals directly from the transmitting teletypewriter equipments and converts them into polar signals to operate the frequency-shift exciter. The teletypewriter unit also accepts the teletypewriter signals from the remote teletypewriter equipments through Radio Set Control C–1306/GRA–14 ((3) below) when arranged for remote operation.

(3) Radio Set Control C–1306/GRA–14 and Remote Switching Control C–1307/GRA–14 form Radio Set Control Group AN/GRA–14. The control group permits remote control operation of the radio set up to a distance of 1 mile from the local site for one-reversible or duplex communication. Remote or local operation is selected by preparing the switches, controls, and cords on the remote switching and radio set control units. Teletypewriter equipments (not shown) similar to those connected to the teletypewriter control unit may be connected to the remote switching control unit at the remote site for the modes of operation listed above. In addition to providing outputs to the teletypewriter control unit, the radio set control unit provides a telephone output to Speech Amplifier BC–614–(*) developed by Telephone EE–8–(*).

(4) The frequency-shift exciter receives its input signal from the teletypewriter control unit. It functions as a low-power exciter stage of the radio transmitter and has an adjustable modulator output for a frequency coverage from 2 to 6 megacycles (mc). Since its highest frequency output is 6 mc, frequency multiplication must take place in the radio transmitter when assigned frequencies of more than 6 mc are used. When the frequency-shift exciter is adjusted to drive the transmitter, initial tuning is accomplished so that the normal frequency is that frequency assigned by the pertinent SOI (signal operating instructions).

(5) When a mark signal is received by the frequency-shift exciter input circuit, the RF output signal of the frequency-shift exciter is the assigned frequency. A *space* signal arriving from the teletypewriter control unit shifts the frequency-shift exciter RF signal *down* from the mark frequency by 212.25, 425, or 850 cps, the exact shift depending on the frequency multiplication factor used. For example, if the assigned frequency as listed in the SOI is 2,000 kilocycles (kc), then the frequency-shift exciter output frequency would be 2,000 kc and no frequency multiplication would take place. Therefore, the mark frequency of the frequency-shift exciter would be the assigned frequency, or 2000 kc. The space signals will shift this frequency down to 1999.15 kc, or 850 cycles lower. In summation, the shift from mark to space of the actual transmitted signal is *always* 850 cps, while the shift of the frequency-shift exciter output can be any one of three values, depending on the frequency multiplication taking place in the radio transmitter. The output of the frequency-shift exciter is applied to the radio transmitter at the crystal socket of the particular tuning unit used.

Transmitter frequency (mc)	Multiplication factor	Exciter frequency (mc)	Exciter output frequency shift (cps)
2 to 4	1	2 to 4	850
4 to 12	2	2 to 6	425
12 to 18	4	3 to 4. 5	212. 25

(6) The RF oscillator of the transmitter develops a frequency which is controlled by the frequency of the frequency-shift exciter output. Output from the oscillator is passed to a buffer amplifier and frequency multiplier stage. The output of the multiplier stage drives the intermediate amplifier which in turn supplies the proper RF excitation for operating the class C power-amplifier (pa) stage. The output of the pa stage is link-coupled into the balanced doublet antenna system; or when a whip antenna is required, Antenna Tuning Unit BC–939–B provides the proper impedance match for transferring the RF output

of the transmitter to the vertical whip antenna.

(7) The input circuit of Speech Amplifier BC–614–(*) provides for connecting either a carbon-type microphone or a dynamic-type microphone. Audio frequencies developed by the microphone or Telephone EE–8–(*) (connected to local control unit) are amplified and then applied through a cable to the audio-frequency (af) driver stage in the transmitter. The af driver stage furnishes sufficient af power to drive the class B modulator, which supplies the modulating signal for the pa stage. From the pa stage, the modulated carrier signal is applied to the antenna from which the signal is radiated into space.

b. Receiving Circuits (fig. 14). The receiving circuits consist of two Radio Receivers R–388/URR, Frequency Shift Converter CV–182(*)/GRC–26A, Power Supply PP–712(*)/GRC–26A (not shown), part of Radio Set Control Group AN/GRA–14, part of Radioteletypewriter Control C–808/GRC–26A, Teletypewriter TT–55/MGC or TT–4A/TG and Perforator-Transmitter TT–56/MGC, two Loudspeakers LS–3, and Headset HS–30–(*) (not shown).

(1) The RF signals picked up by the space diversity receiving antennas are applied to the input circuits of the radio receivers. The incoming RF signals consist of a carrier which has been frequency-shifted by *mark* and *space* teletypewriter signals and, when required, amplitude-modulated by voice frequencies. The RF signals are amplified and converted to a lower frequency in the receiver RF amplifier and converter stages and the resulting IF signal is further amplified and applied to the detector stage, where the AF component is selected from the IF signal. From the detector stage, the AF component is applied to the loudspeaker and also to the radio set control unit for distribution to Telephone EE–8–(*). The frequency-shifted IF signals containing the mark-space component are also taken off at the output terminals of the last IF stage and applied to the frequency-shift converter.

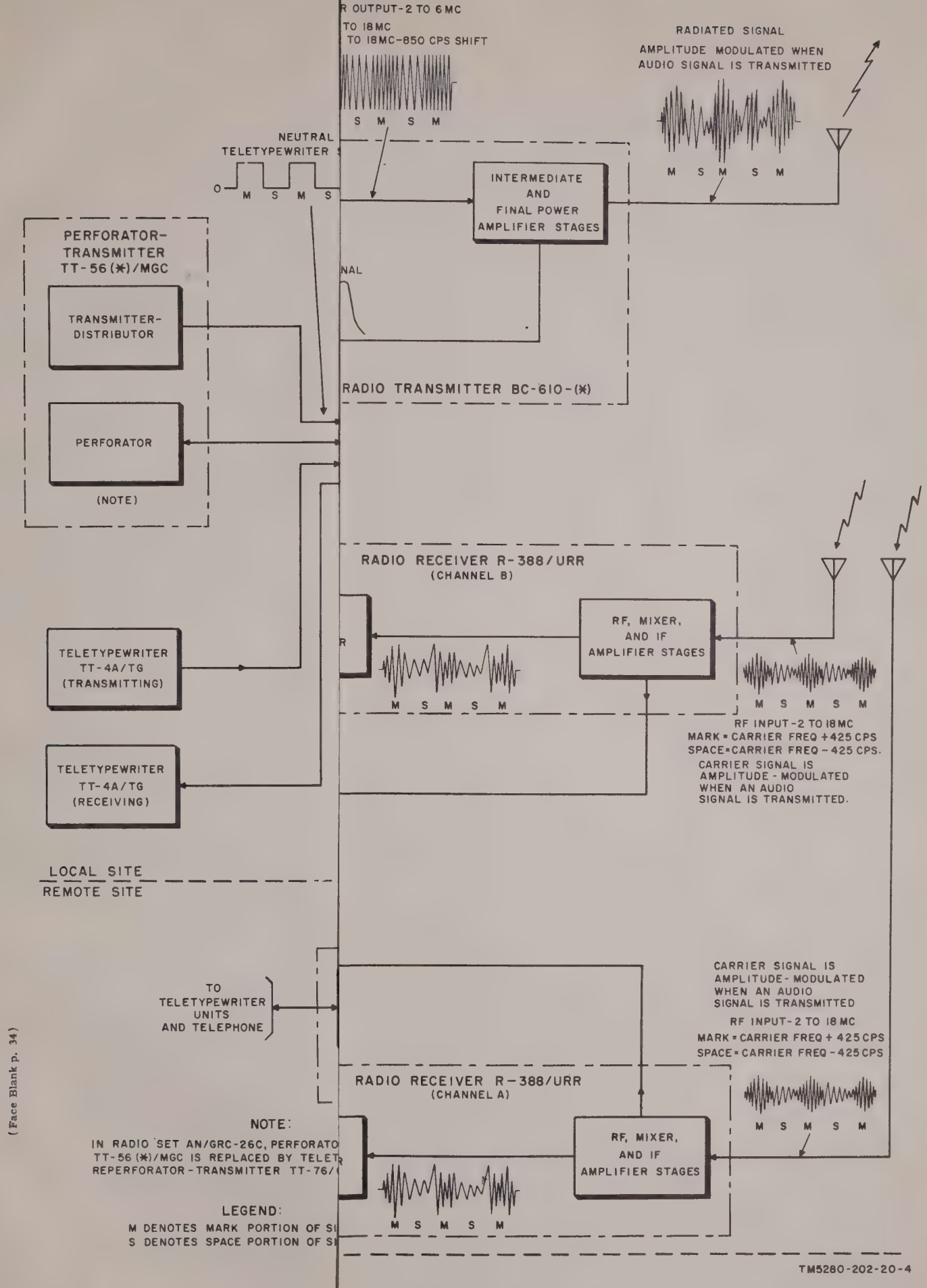
(2) The frequency-shift converter has two identical input circuits, each of which accepts the frequency-shifted IF signals from one receiver channel. These signals are converted to lower frequency RF signals (50 kc and 29.3 kc) which are passed into a common limiter circuit where all AM components are removed. The discriminator network then converts the mark and space RF components into mark and space dc signals, and applies them to the output circuit. This circuit provides further dc amplification and the polar termination for the neutral output signals. Polar signal output is also provided by the converter.

(3) The radio set and teletypewriter control units receive the neutral signals from the converter output and distribute them to the teletypewriter equipments. Switching facilities are provided so that the individual teletypewriter equipments can be selected as required. When remote operation is selected, teletypewriter signals are applied to the remote switching control unit which further applies the signals to the remote teletypewriter units.

c. Receiving Antennas.

(1) For dual diversity reception, the signal voltage is fed to the two receivers from two doublet antennas which are spaced a minimum of 3 wavelengths apart (or a maximum of 950 feet). These antennas are similar to the transmitting doublet antenna in both construction and directivity. RF Cable Assembly CG–557A/U is used for the signal feed line between the antennas and the shelter. If possible, the radiation lobes of the receiving antennas should not be directed across the local transmitting antenna.

(2) When whip antennas are used (as in mobile operation), the distance over which satisfactory reception can be achieved is shorter than with the doublet antenna. In addition, they are noisier than the doublet because noise is usually vertically polarized and because they receive equally well in all directions.



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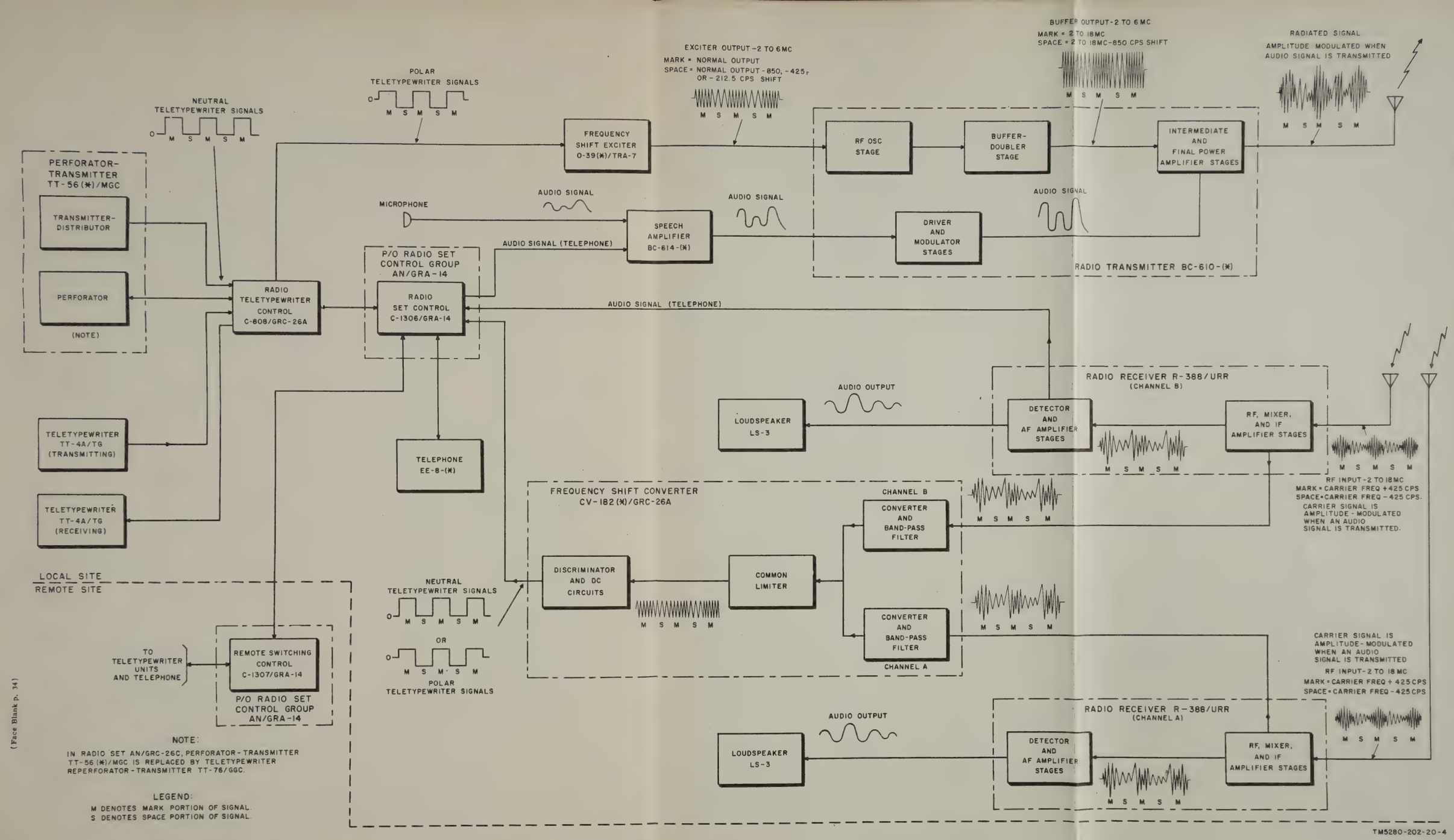
POLAR TELETYPEWRITER SIGNALS
NEUTRAL TELETYPEWRITER SIGNALS
EXCITER OUTPUT - 2 TO 6 MC
MARK = NORMAL OUTPUT
SPACE = NORMAL OUTPUT - 850, - 425, OR - 212.5 CPS SHIFT
BUFFER OUTPUT - 2 TO 6 MC
MARK = 2 TO 18 MC
SPACE = 2 TO 18 MC - 850 CPS SHIFT
RADIATED SIGNAL
AMPLITUDE MODULATED WHEN AUDIO SIGNAL IS TRANSMITTED
PERFORATOR-TRANSMITTER TT-56(*)/MGC
TRANSMITTER-DISTRIBUTOR
PERFORATOR
(NOTE)
FREQUENCY SHIFT EXCITER O-39(*)/TRA-7
RF OSC STAGE
BUFFER-DOUBLER STAGE
INTERMEDIATE AND FINAL POWER AMPLIFIER STAGES
MICROPHONE
AUDIO SIGNAL
SPEECH AMPLIFIER BC-614-(*)
AUDIO SIGNAL (TELEPHONE)
DRIVER AND MODULATOR STAGES
RADIO TRANSMITTER BC-610-(*)
P/O RADIO SET CONTROL GROUP AN/GRA-14
RADIO TELETYPEWRITER CONTROL C-808/GRC-26A
RADIO SET CONTROL C-1306/GRA-14
TELETYPEWRITER TT-4A/TG (TRANSMITTING)
TELETYPEWRITER TT-4A/TG (RECEIVING)
TELEPHONE EE-8-(*)
LOUDSPEAKER LS-3
RADIO RECEIVER R-388/URR (CHANNEL B)
DETECTOR AND AF AMPLIFIER STAGES
RF, MIXER, AND IF AMPLIFIER STAGES
RF INPUT - 2 TO 18 MC
MARK = CARRIER FREQ + 425 CPS
SPACE = CARRIER FREQ - 425 CPS.
CARRIER SIGNAL IS AMPLITUDE - MODULATED WHEN AN AUDIO SIGNAL IS TRANSMITTED.
FREQUENCY SHIFT CONVERTER CV-182(*)/GRC-26A
CHANNEL B
CONVERTER AND BAND-PASS FILTER
DISCRIMINATOR AND DC CIRCUITS
COMMON LIMITER
CONVERTER AND BAND-PASS FILTER
CHANNEL A
LOCAL SITE
REMOTE SITE
TO TELETYPEWRITER UNITS AND TELEPHONE
REMOTE SWITCHING CONTROL C-1307/GRA-14
P/O RADIO SET CONTROL GROUP AN/GRA-14
NEUTRAL TELETYPEWRITER SIGNALS
OR
POLAR TELETYPEWRITER SIGNALS
RADIO RECEIVER R-388/URR (CHANNEL A)
DETECTOR AND AF AMPLIFIER STAGES
RF, MIXER, AND IF AMPLIFIER STAGES
CARRIER SIGNAL IS AMPLITUDE - MODULATED WHEN AN AUDIO SIGNAL IS TRANSMITTED
RF INPUT - 2 TO 18 MC
MARK = CARRIER FREQ + 425 CPS
SPACE = CARRIER FREQ - 425 CPS
LOUDSPEAKER LS-3
AUDIO OUTPUT
M S M S M
TM5280-202-20-4

NOTE:
IN RADIO SET AN/GRC-26C, PERFORATOR-TRANSMITTER TT-56(*)/MGC IS REPLACED BY TELETYPEWRITER REPERFORATOR-TRANSMITTER TT-76/GGC.

LEGEND:
M DENOTES MARK PORTION OF SIGNAL.
S DENOTES SPACE PORTION OF SIGNAL.

Figure 14. Radio Set AN/GRC-26(*), system block diagram.

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CHAPTER 3

SHIPMENT AND LIMITED STORAGE

18. Disassembly of Equipment

Disassembly of Radio Set AN/GRC–26A, –26B, and –26C is covered in TM 11–5820–202–10.

19. Repackaging for Shipment or Limited Storage

The exact procedure in repackaging for shipment or limited storage depends on the material available and the conditions under which the equipment is to be shipped or stored.

a. Material Requirements. The following materials are required for repackaging Radio Set AN/GRC–26(*). For stock numbers of materials, refer to SB 38–100.

Material	Quantity
Waterproof paper	20 sq ft.
Waterproof tape	1 roll.
Gummed paper tape	2 rolls.
Sash cord, cotton No. 8	5 lbs.
Sash cord, cotton No. 24	5 lbs.
Cotton bags with drawstring	12 ea.
Corrugated fiberboard	750 sq ft.
Wood box	1 ea.

b. Repackaging.

(1) Place protective wrappings around the heater, fire extinguisher, and other unprotected components.

(2) Place bags of silica gel inside the shelter and cabinets to act as a dehydrating agent.

(3) Brace and shore-up the interior of the shelter if the required material is available.

(4) Stow all loose items such as the headset, key, and technical manuals in the compartments of the wall cabinet.

(5) Remove the time stamp from the bench, wrap it thoroughly, and stow it in the bench compartment.

(6) Fill the empty spaces in the cabinet to prevent the contents from shifting. Close and lock cabinet from doors.

(7) Stow coaxial cables and reels, antenna mast equipment, power cables, and Reel RL–31 in the shelter to prevent them from being lost if the trailer becomes separated from the shelter. Secure all these components to prevent them from shifting during transportation.

(8) Close and lock the shelter door. Close and secure the blackout shields over the closed windows and skylight. Tape two lance poles together and fasten them within the upper brackets of one side of the shelter. Fasten the remaining two poles on the other side of the shelter. Seal door, windows, roof-hatch, and feed-through holes with waterproof sealing tape and sealing compound.

(9) For packing Power Unit PE–95–G, refer to TM 11–904.

APPENDIX I

REFERENCES

Following is a list of applicable references available to the organizational maintenance man of Radio Set AN/GRC–26(*):

AR 380–5	Military Security.
SB 38–100	Preservation, Packaging and Packing Materials, Supplies, and Equipment Used in the Army.
TB 11–5083–1	Test Data for Electron Tube Test Sets TV–7/U, TV–7A/U, and TV–7B/U.
TB SIG 223	Field Expedients for Wire and Radio.
TM 11–257	Frequency Shift Exciters O–39/TRA–7, O–39A/TRA–7, O–39B/TRA–7, and O–39C/TRA–7.
TM 11–333	Telephones EE–8, EE–8–A, and EE–8–B.
TM 11–352	Printer TG–7–A and Teletypewriters TG–7–B and TG–37–B, and TT–55/MGC.
TM 11–826	Radio Transmitter BC–610–E, –F, –G, –H, and –I, and Transmitter T–213/GRC–26, and Antenna Tuning Unit BC–939–A and –B.
TM 11–854	Radio Receiver R–388/URR.
TM 11–904	Power Units PE–95–A, –B, –C, –F, –G, –H, –I, and –K.
TM 11–957	Rectifier RA–87.
TM 11–957A	Rectifier RA–87–A.
TM 11–2201	Reperforator Teletypewriter Sets TC–16 and TC–17 (including Reperforator Transmitters TG–26–A and –B, and Perforator Transmitter TT–56/MGC).
TM 11–2222	Transmitter Distributors TT–26/FG and TT–52/FG, Receiving Transmitter Distributors TT–12/FGQ–1, TT–13/FGQ–1, TT–21/FG, TT–TT–21A/FG, 25/FG, and Teletype Model 14 Transmitter Distributors XD82, XD99, XD221.
TM 11–2223	Typing and Nontyping Reperforators, Teletype Model 14.
TM 11–2225	Teletypewriter Sets AN/GGC–3 and AN/GGC–3A, and Teletypewriter Reperforator-Transmitters TT–76/GGC, and TT–76A/GGC.
TM 11–2234	Teletypewriter Sets AN/PGC–1 and AN/TGC–7A, and Teletypewriters TT–4/TG, TT–4A/TG, and TT–173A/TG.
TM 11–5054	Speech Amplifier BC–614–E, –F, –G, –H, and –I.
TM 11–5062	Frequency Shift Converter CV–182/GRC–26A, CV–182A/GRC–26A, and CV–182B/GRC–26A, and Power Supplies PP–712/GRC–26A and PP–712A/GRC–26A.
TM 11–5083	Electron Tube Test Sets TV–7/U, TV–7A/U, and TV–7B/U.
TM 11–5820–202–10	Radio Set AN/GRC–26A, AN/GRC–26B, and AN/GRC–26C, Operator's Manual.

APPENDIX II

MAINTENANCE ALLOCATION CHART FOR RADIO SETS AN/GRC–26, AN/GRC–26A, AN/GRC–26B, AND AN/GRC–26C

Section I. INTRODUCTION

1. Scope

a. General. The maintenance allocation portion of this manual assigns maintenance functions and repair operations to be performed by the lowest appropriate maintenance echelon. It also specifies the tools and test equipments authorized for each echelon for the performance of the assigned functions.

b. Columns. The columns of section II are defined as follows:

(1) *Part or component.* Column 1 shows only the nomenclature or standard item name. Additional descriptive data are included only where clarification is necessary to identify the part. Components and parts comprising a major end item are listed alphabetically. Assemblies and subassemblies appear in alphabetical order with their components listed alphabetically immediately below the assembly listing.

(2) *Related operation.* Column 2 indicates the various maintenance functions allocated to the echelon capable of performing the operation. These are defined as follows:

(*a*) *Service.* To clean, to preserve, and to replenish fuel and lubricants.

(*b*) *Adjust.* To regulate periodically to prevent malfunction.

(*c*) *Inspect.* To verify serviceability and to detect incipient electrical or mechanical failure by scrutiny.

(*d*) *Test.* To verify serviceability and to detect incipient electrical or mechanical failure by use of special equipment such as gages, meters, etc.

(*e*) *Replace.* To substitute serviceable assemblies, subassemblies, and parts for unserviceable components.

(*f*) *Repair.* To restore to a serviceable condition by replacing unserviceable parts or by any other action required utilizing tools, equipment and skills available, to include welding, grinding, riveting, straightening, adjusting, etc.

(*g*) *Aline.* To adjust two or more components of an electrical system so that their functions are properly synchronized.

(*h*) *Calibrate.* To determine, check, or rectify the graduation of an instrument, weapon, or weapons system, or components of a weapons system.

(*i*) *Rebuild.* To restore to a condition comparable to new by disassembling the item to determine the condition of each of its component parts and reassembling it using serviceable, rebuilt, or new assemblies, subassemblies, and parts.

(3) *1st, 2nd, 3rd, 4th, and 5th echelon.*

(*a*) The symbol X in columns 3, 4, 5, 6, and 7 indicates that that echelon and higher echelons are responsible for the maintenance function indicated. Repair parts may not be necessarily stocked at the echelon indicated; refer to applicable repair parts and special tools list.

(*b*) The double percent symbol in the second echelon column indicates that second echelon may perform that particular maintenance function if the request is initiated at the organizational

level and is specifically authorized by the direct support technical service officer. This symbol applies only to the replacement of major assemblies and time consuming operations which are within the capabilities of organizational maintenance. The authorization of a double percent function will be directed only by U.S. Army Signal Equipment Support Agency, and in no case will a double percent function authorize stockage of parts at the organizational level.

(4) *Repair facilities code.* Column 8 is not used in the chart.

(5) *Remarks.* Column 9 contains any notations necessary to clarify the data cited in the preceding columns.

c. Section III. Allocation of tools for maintenance functions, contains columns as follows:

(1) *Facilities required for maintenance operations.* Column 1 lists the tools, test, and maintenance equipment required to perform the maintenance functions.

(2) *1st, 2nd, 3rd, 4th, and 5th echelon.* The dagger symbol (†) in columns 2, 3, 4, 5, and 6 indicates that the tool or test equipment is allocated to that echelon.

(3) *Repair facilities code.* The numbers in this column are not applied to the allocation of maintenance functions.

(4) *Remarks.* Column 8 is used for explanatory notes.

2. Contents of Maintenance Allocation Chart

The major items for which detailed maintenance functions are given appear in the following sequence:

Radio Sets AN/GRC–26, AN/GRC–26A, AN/GRC–26B, and AN/GRC–26C; Radio Teletypewriter Control C–808/GRC 26A; Control Box C–345A/MRC–2.

3. References

Additional instructions concerning maintenance of this equipment are contained in:

TM 11–809–20	Organizational Maintenance, Radio Transmitter T–368/URT, and T–368A/URT, T–368B/URT, and T–368C/URT and Antenna Tuning Unit BC–939–B.
TM 11–5820–230–20	Radio Set Control Group AN/GRA–14.
TM 11–5820–251–20	Mast AB–155/U

4. Comments or Suggestions

Any comments concerning omissions and discrepancies in this publication will be prepared on DA Form 2028 and forwarded direct to Commanding Officer, U.S. Army Signal Equipment Support Agency, Fort Monmouth, N.J., ATT: SIGFM/ES–M.

(1) PART OR COMPONENT	(2) RELATED OPERATION	(3) 1st ECH	(4) 2nd ECH	(5) 3rd ECH	(6) 4th ECH	(7) 5th ECH	(8) REPAIR FACILITIES CODE	(9) REMARKS
RADIO SET AN/GRC-26A, B, C	repair			X				
	rebuild					X		
	inspect	X						Preventive maintenance
AMPLIFIER BC-614	replace	X						
BASE, MAST MP-47	replace	X						
BASE, MAST MP-65A,B	replace	X						
	repair			X				
	rebuild					X		
	inspect	X						Preventive maintenance
BOX	rebuild					X		
BRACKETS	replace	X						
BRAID; WIRE	replace			X				
CABLE ASSEMBLIES	replace	X						
	repair			X				
CABINET	replace	X						
	rebuild					X		
CAPACITOR	replace			X				
CASE	replace	X						
	rebuild					X		
CHAIRS	replace	X						
CIRCUIT BREAKER	replace			X				
	repair			X				
	rebuild					X		
CLAMP, CABLE	replace		X					
CLIPBOARD	replace	X						
CLIP	replace		X					
CLOCK	replace	X						
COMPASS	replace	X						
CONNECTORS	replace		X					
CONTROL C-808/GRC-26	replace		X					
	repair			X				
	rebuild					X		
	inspect	X						Preventive maintenance
AMMETER	replace			X				
	repair					X		
	rebuild					X		
BAR	replace			X				
CABLE	replace			X				

(1) PART OR COMPONENT	(2) RELATED OPERATION	(3) 1st ECH	(4) 2nd ECH	(5) 3rd ECH	(6) 4th ECH	(7) 5th ECH	(8) REPAIR FACILITIES CODE	(9) REMARKS
AN/GRC-26; AN/GRC-26A,B,C (continued)								
CAPACITORS	replace			X				
CLAMPS	replace			X				
CONNECTORS	replace			X				
CORD	replace		X					
	repair			X				
ELECTRON TUBES	replace		X					
FOOT MOUNTING	replace			X				
FUSE	replace	X						
FUSEHOLDER	replace			X				
INSULATORS; PLATES AND WASHERS	replace			X				
JACKS	replace			X				
KNOBS	replace		X					
LAMP	replace		X					
LENS	replace	X						
LIGHT, INDICATORS	replace			X				
MOUNT, VIBRATION	replace			X				
PLATE, INDENTIFICATION	replace			X				
PLUG PJ-055	replace			X				
POST; SUPPORT AND BINDING	replace			X				
REACTORS	replace			X				
RECTIFIERS	replace			X				
RELAY	replace		X					
RESISTORS	replace			X				
RETAINERS	replace			X				
SOCKETS	replace			X				
SWITCHES	replace			X				
THUMBSCREW	replace		X					
TRANSFORMER	replace			X				
CONTROL C-345A/MRC-2	replace		X					
	repair			X				
	rebuild					X		
	inspect	X						Preventive maintenance
CLAMP	replace			X				
CORD	replace			X				
COVER	replace			X				
JACK	replace			X				
KNOB	replace			X				
PLUG PJ-68	replace			X				
RESISTOR, VARIABLE	replace			X				

(1) PART OR COMPONENT	(2) RELATED OPERATION	(3) 1st ECH	(4) 2nd ECH	(5) 3rd ECH	(6) 4th ECH	(7) 5th ECH	(8) REPAIR FACILITIES CODE	(9) REMARKS
AN/GRC-26; AN/GRC-26A,B,C (continued)								
CONTROL BE-77-A	replace		X					
	repair			X				
	rebuild					X		
	inspect	X						Preventive maintenance
CONTROL C-292/TRA-7	replace		X					
CONVERTERS CV-31/TRA-7, CV-182/GRC-26A	replace		X					
CORDS	replace	X						
	repair			X				
ENGINE GENERATOR SET PU-294/G	replace		%%					
FREQUENCY METER BC-221	replace		X					
GUYS	replace	X						
HAMMER	replace	X						
HEATER, AIR	replace		X					
	rebuild					X		
HEADSET HS-30	replace	X						
	repair			X				
	rebuild					X		
INSULATORS	replace	X						
KEY J-45	replace	X						
	repair			X				
	rebuild					X		
LEADS: WIRE BRAID	replace			X				
LOUDSPEAKER	replace	X						
	repair			X				
	rebuild					X		
MAST AB-155/U	replace	X						Separate MAC
MAST SECTIONS	replace	X						
MICROPHONES T-11, T-50	replace	X						
	repair			X				
	rebuild					X		
MOUNTINGS	replace	X						
	repair			X				
	rebuild					X		
OSCILLATOR O-39/TRA-7	replace	X						
PAD, SILENCING	replace		X					
POWER SUPPLIES: PP-712/GRC-26A, RA-87, RA-133	replace		X					Separate MAC
RACKS	replace		X					
	repair			X				
	rebuild					X		

(1) PART OR COMPONENT	(2) RELATED OPERATION	(3) 1st ECH	(4) 2nd ECH	(5) 3rd ECH	(6) 4th ECH	(7) 5th ECH	(8) REPAIR FACILITIES CODE	(9) REMARKS
AN/GRC-26; AN/GRC-26A,B,C (continued)								
REPERFORATOR-TRANSMITTERS: TT-56/MGX, TT-76/GGC	replace		X					
RADIO SET CONTROL: AN/GRA-14	replace		X					Separate MAC
RECEIVERS: R-336/GRC-26, R-388/URR	replace		X					
REEL RL-29	replace	X						
SHELTERS: S-55/GRC, S-69/GRC	repair			X				
	rebuild					X		
	inspect	X						Preventive maintenance
TUNER, RF: BC-939	replace		X					Separate MAC
TELETYPEWRITERS: TT-4/TG, TT-55/MGC	replace		%%					
SWITCHING UNIT: C-535/GRC-26	replace		X					
TRANSMITTERS: BC-610, T-213/GRC-26	replace		%%					

(1) FACILITIES REQUIRED FOR MAINTENANCE OPERATIONS	(2) 1st ECH	(3) 2nd ECH	(4) 3rd ECH	(5) 4th ECH	(6) 5th ECH	(7) REPAIR FACILITIES CODE	(8) REMARKS
AN/GRC-26; AN/GRC-26A,B,C (Continued)							
ANALYZER, SPECTRUM TS-723( )/U				†	†	1	
AUDIO OSCILLATOR TS-382( )/U				†	†	2	
DISTORTION TEST SET TS-2( )/U			†			3	
DISTORTION TEST SET TS-383( )/U				†	†	4	
DUMMY LOAD (to be determined)			†	†	†	5	
ELECTRONIC MULTIMETER TS-505( )/U			†	†	†	6	
FREQUENCY METER AN/URM-79				†	†	7	
FREQUENCY COUNTER FR-67( )/U				†	†	8	
FREQUENCY METER AN/URM-32			†	†	†	9	
POWER SUPPLY PP-1243/U						10	For AC operation of AN/URM-32
MULTIMETER AN/URM-105		†	†	†	†	11	
SHUNT, INSTRUMENT, MULTIRANGE MX-1471			†	†	†	12	
OSCILLOSCOPE OS-8A/U			†	†	†	13	
RF SIGNAL GENERATOR SET AN/URM-25			†	†	†	14	
TEST SET, TELEPHONE AN/PTM-6				†	†	15	
TEST SET, ELECTRON TUBE TV-2( )/U					†	16	
TEST SET, ELECTRON TUBE TV-7( )/U		†	†	†		17	
TUBE SOCKET ADAPTER KIT MX-1258/U		†	†	†		18	
VOLTMETER, METER ME-30( )/U			†	†	†	19	
TOOL EQUIPMENT TE-41		†				20	
TOOL EQUIPMENT TE-49			†	†	†	21	
TOOL EQUIPMENT TE-50 TS7 (desc MULTIMETER TS-297/U)		†	†	†	†	22	
TOOL EQUIPMENT TE-111			†	†	†	23	
TOOL EQUIPMENT TE-113			†	†	†	24	
TOOL EQUIPMENT TE-114			†	†	†	25	

[AG 413.44 (28 Nov 58)]

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For explanation of abbreviations used, see AR 320-50.

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